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ON A NEW METHOD OF PRODUCING CARBONIC OXIDE.

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In 1820, my learned master, M. Chevreul, published a most interesting paper on various coloring matters, and drew the attention of the scientific world at that time to the property which most coloring matters possessed of absorbing oxygen under the influence of alkalies; and although he demonstrated the great advantage possessed by gallic and pyrogallic acids, as agents for analyzing the atmosphere, by the extraordinary rapidity with which they absorbed oxygen under the influence of alkalies, still this valuable observation of M. Chevreul remained dormant for nearly twenty years, when Liebig again proved with what facility air could be analyzed by this method. I wish now to call your special attention to this mode of absorbing oxygen in a gas mixture, as it is considered by many chemists to be quite as accurate as those methods which are based upon the employment of phosphorous or metallic copper, as suggested by Gay-Lussac; but this is not correct, for I have observed that it contains a serious source of error, because during the absorption of oxygen by the gallic or pyrogallic acid, under the influence of alkalies, a certain quantity of a permanent and combustible gas is produced, viz., oxide of carbon.

It was during a series of experiments which I had undertaken, to verify a most interesting fact, published by M. Boussingault, viz, the production of oxide of carbon during vegetation under water, or the decomposition of carbonic acid under the influence of solar rays (see *Comptes Rendus*, vol. 63, p. 862, 1862), that I discovered that the oxide of carbon, which M. Bonssingault had obtained in his analysis of the gas mixture produced during vegetation, was not due, as he thinks, to the reduction of carbonic acid into oxide of carbon; but that this gas was a product of oxidation, or the result of the action of oxygen on the pyrogallic acid that he used for analyzing his gas mixtures.

The following details of my experiments will, I trust, clearly prove this curious production of oxide of carbon:

1. If over a mercury trough 100 cubic centimetres of oxygen are introduced under a bell jar, together with pyrogallic acid and potash, although the greatest portion of the oxygen is rapidly absorbed, still, whatever number of hours the substances are left in contact, there will always remain a certain residue incapable of further absorption, and on examining this residue, it will be found to burn with a blue flame, and to be converted thereby into carbonic acid, which compound is easily characterized.

2. If two litres of oxygen, free from any trace of carbonic acid, are made to pass through a solution of pyrogallate of potash, placed in Liebig's bulb apparatus, and from thence over carefully prepared oxide of copper, heated to a dull red heat, carbonic acid will be found to issue from the apparatus, and can be collected and weighed.

3. If an unabsorbed portion of gas remaining in the receiver (Experiment No. 1), be brought into contact with a solution of protochloride of copper, dissolved in hydrochloric acid or ammonia, the residue will be absorbed, which is an additional characteristic property of oxide of carbon, as indicated by M. Le Blanc.

4. If one volume of this residual gas be introduced into a eudiometer, and after being mixed with one volume of oxygen, the mixture be exploded by an electrical spark, it is found that half the volume of oxygen employed has disappeared, and that the volume of carbonic acid formed is equal to that of the oxide of carbon introduced into the eudiometer.

As to the quantity of oxide of carbon produced during these experiments, it depends, firstly, upon the concentration of the pyrogallate employed, and secondly, upon its neutral or alkaline state, the minimum being with the acid liquor, and the maximum with an alkaline.

In taking the mean of ten distinct experiments, I found that 100 volumes of oxygen gave two volumes of oxide of carbon, but in some instances the proportion was as high as four per cent.

The production of oxide of carbon also occurs when atmospheric air is substituted for oxygen, only the oxide of carbon is so much diluted by the nitrogen that its presence cannot be detected by several of the above methods. But if, on the other hand, several quarts of air, carefully deprived of carbonic acid, are passed through an alkaline solution of pyrogallate or gallate of soda, and from thence over some heated oxide of copper, carbonic acid will be found issuing from the apparatus, and can be easily characterized, and even weighed.

It is no doubt owing to the difficulty of detecting a small quantity of oxide of carbon, when diluted with nitrogen, that the presence of that gas has not been observed before by chemists, who have employed Chevreul's and Liebig's method of analyzing the atmosphere.

M. Boussingault having observed the presence of a light carburetted hydrogen in the residuum which he obtained in analyzing the gases which were produced by vegetation under water, and under the influence of solar rays, I made careful and repeated efforts, with the object of detecting it, but failed to do so. I therefore suspect that this gas was the result of decomposition of some of the organic substances present in his experiments.

WATER SUPPLY OF PARIS.

The municipal council of Paris have resolved to increase the drinkable water with which the inhabitants of Paris are supplied from the Seine by the addition of the waters of the Dhuys and the Somme-Sonde, and likewise by drawing forty thousand cubic metres of water daily from the Marne by means of water-works to be established at the village of St. Maur. The plan has been approved by the Administration of Public Works, and is to be carried into execution forthwith. The navigation of the river will not be impeded by the proposed water-works, as boats may pass by the canal of St. Maur, which is to be continued to the Seine, and will afford them a short and safe course. The works for bringing the waters of the Dhuys to Paris are being likewise continued. The channel through which the water is to flow is to be 80 miles long, to be constructed of masonry, and to pass under the soil. Metal pipes are to be inserted wherever the nature of the ground may require them. This channel is to be carried through the department of the Seine, by the commune of Rosny-sous-Bois, at the extremity of the fort of that name, will traverse the communes of Noisy-le-Sec and Romainville, flank Bagnolet, cross the fortifications at the gate of Menilmontant, and finish at the reservoir to be constructed in the ancient park of St. Fargeau. This reservoir is to be solidly built in masonry, and carefully covered, so as to prevent the water being heated in summer or frozen in winter. The covering will likewise prevent the growth of vegetable matter, and it will secure the water within from the presence of any objects carried by the wind. The interior will be divided into several compartments, which may be emptied in succession, and thus cleansed or repaired as occasion may require. Several large pipes are to be laid down, of which the first will supply Belleville, where a reservoir is to be established. The second will follow the Rue Menilmontant to the ancient boulevards, where it will form two branches; one will convey water to Montmatre and the other to the bridge of Austerlitz. From the bridge of Austerlitz, which it will cross by means of a channel, it will follow the Boulevard de l'Hopital and the projected Boulevard St. Marcel, and supply the inhabitants of the plain of Montrouge and of the Pantheon.

PNEUMATIC DESPATCH CO., OF LONDON.

The Pneumatic Despatch Company are about to lay down a large tube for the transmission of letters and parcels from their station in Holbern to a station to be established near the General Post-office, in St. Martin's-le-Grand. It appears a tube of that kind already exists between the Northwestern district post-office, in Eversholt street, and the Euston terminus of the London and Northwestern Railway, and that the letters have been carried between those parts since the beginning of February last. It is now proposed to lay a tube from the Euston station, through Woburn place, Southampton row, and King street, to Holborn, and thence along Holborn, Skinner street, and Newgate street, to the General Post-office. This tube is to be of cast-iron, 4 feet high, and 4 feet 6 inches wide, internally. At the city boundary it will be 11 feet 6 inches deep, and at Hatton garden 18 feet 6 inches, from which point its depth decreases. The tube will pass over the Fleet sewer at a depth of 6 feet, and then under the London, Chatham, and Dover Railway. At the west end of Newgate street it will be 25 feet deep, and at the east end 14 feet; its mean depth in St. Martin's le-Grand being 12 feet. When completed, the transmission of all letters in bulk between the General Post office and the North-Western Railway, will be effected by its agency, as will also large parcels of goods. An arrangement has been made with Messrs. Pickford to forward parcels from their depot in Gresham street to the North-Western Railway, and an extension of the tube into their premises is ultimately contemplated. This line of tubing, moreover, is understood to be but the commencement of a system which is to be eventually extended to the various metropolitan railway stations, and probably to connect all the district post-offices in London. The Pneumatic Despatch Company have powers under their act to lay down tubes within the city, subject to certain control or direction on the part of the Commissioners of Sewers.

GAS IN GERMANY.—Gas works have been built in the town of Reichenbach, Silesia, by M. Julius Ebbighaus. The works were finished in October last, and supply 900 private burners, and 58 public lamps.

At Frankenstein, gas-works have also been built. They supply 500 private burners and 53 public lamps.

At Augsburg a society has been formed for the purpose of buying a number of works built by M. Riedinger. The capital is fixed at 2,000,000 florins, on which M. Riedinger guarantees an interest of 5 per cent.

The works included in this operation comprise those of Ancona, Breschia, Debrezin, Agram, Peschiera, Eichstadt, Kulembach, Kaufbauern, Donauwaerth, Memmingen, Inspruck, and Sigmaringen.

GAS-LIGHT COMPANIES IN THE UNITED STATES.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1857	ADRIAN	Mich.	50,000	50	—	May & November.	4,000	3 50	....	....	
1856	AKRON	O.	20,000	33⅓	—	Do.	3,500	3 00	....	....	
1845	ALBANY	N. Y.	25,000	20	4	January & July.	65,000	3 00	120	....	None in market.
1858	ALBION	N. Y.	30,000	100	—	Do.	3,000	3 80	....	....	
1851	ALEXANDRIA	Va.	106,530	—	—	City Works.	9,000	3 50	....	....	
1852	ALLEGHANY	Pa.	200,000	25	4	May & November.	25,000	3 00	....	....	
1858	ALLENTOWN	Pa.	60,000	100	3½	Do.	5,000	3 50	....	....	
1857	ALTON	Ill.	75,000	—	—	Private Works.	4,000	3 50	....	....	
1859	ALTOONA	Pa.	40,000	20	4	January & July.	5,000	3 00	....	....	
1859	AMESBURY AND SALISBURY	Mass.	30,000	25	—	Do.	7,000	4 00	....	....	
1858	ANNAPOLIS	Md.	100,000	25	—	Do.	4,000	4 00	....	....	
1858	ANN ARBOR	Mich.	23,000	50	5	March & September.	5,500	4 00	....	....	
1858	ASTORIA	N. Y.	20,000	50	—	Do.	6,000	4 00	....	....	
1855	ATLANTA	Ga.	50,000	25	5	January & July.	12,000	5 00	....	....	
1857	ATTLEBORO'	Mass.	6,000	50	3	Do.	2,000	6 00	....	....	
1850	AUBURN	N. Y.	80,000	50	5	Do'	10,000	7 00	....	....	
1851	AUGUSTA	Ga.	80,000	25	3	Do.	9,000	6 00	....	....	
1858	AUGUSTA AND HALLOWELL	Me.	84,700	50	5	Do.	10,000	4 00	....	...	Formerly used Sanders' Water-Gas. Recently altered to Coal Gas-Works.
1860	AURORA	Ind.	10,000	—	—	Private Works.	3,500	3 50	....	...	None for sale.
1817	BALTIMORE	Md.	850,000	100	5	June & December.	150,000	2 50	150	....	
1852	BANGOR	Me.	120,000	100	2½	January & July.	12,000	3 00	100	....	
1855	BATAVIA	N. Y.	32,000	20	4	Do.	2,500	4 00	100	100	Stock firm. Good works and well managed.
1858	BATH	Me.	65,000	100	3	April & October.	10,000	3 75	...	...	
1859	BATH	N. Y.	15,000	50	—	May & November.	3,000	7 00	....	....	
1861	BATTLE CREEK	Mich.	15,000	—	—	January & July.			....	....	
1858	BELFAST	Me.	14,000	100	—	Do.	7,000	7 00	....	....	
1856	BELLEFONT	Pa.	20,000	25	2	Do.	3,500	4 00	....	....	
	BELOIT	Wis.	30,000	—	—	Do.	4,000	4 00	....	....	
1854	BETHLEHEM	Pa.	50,000	50	4	June & December.	2,000	3 20	...	....	
1859	BEVERLY	Mass.	40,000	100	—	January & July.	4,000	4 00	....	....	
1858	BINGHAMPTON	N. Y.	50,000	50	3½	Do.	10 000	4 00	....	....	
1859	BIRMINGHAM	Pa.	40,000	50	—	Do.	4,000	4 00	....	....	
1855	BLOOMINGTON	Ill.	40,000	50	—	Do.	6,000	4 00	....	....	
1858	BORDENTOWN	N. J.	50,000	25	3	June & December.	4,000	3 80	....	....	
1822	BOSTON	Mass.	1,000,000	500	5	Do.	130,000	2 25	....	....	
1859	BRATTLEBORO'	Vt.	21,000	—	—	Do.	3,000	4 00	....	....	
1851	BRIDGEPORT	Ct.	90,000	25	4	January & July.	10,000	4 00	90	....	Passed last dividend.
1857	BRIDGETON	N. J.	50,000	20	—	Do.	5,000	4 00	....	...	
1856	BRISTOL	Pa.	30,000	25	3	February & August.	3,000	4 00	....	....	
1855	BRISTOL	R. I.	35,000	50	2	January & July.	6,000	4 00	....	....	
1859	BROCKPORT	N. Y.	25,000	100	3	Do.	1,500	4 00	....	....	
1858	BROOKLINE	Mass.	66,000	100	3½	February & August.	3,500	3 50	....	....	
1825	BROOKLYN	N. Y.	2,000,000	25	5	January & July.	75,000	2 50	170	160	
	BROWNSVILLE	Pa.				Do.			....	....	
1848	BUFFALO	N. Y.	600,000	50	5	Do.	70,000	2 90	140	125	
1852	BURLINGTON	N. J.	100,000	25	3½	Do.	5,000	4 00	105	....	
1858	BURLINGTON	Vt.	75,000	25	2½	Do.	10,000	4 50	....	....	
1859	BURLINGTON	Iowa.	65,000	50	—	Do.	8,000	4 00	....	....	
1861	CALAIS	Me.	90,000	100	—	Do.	10,000	3 50	....	...	
1852	CAMBRIDGE	Mass.	500,000	100	5	February & August.	20,000	3 50	100	97½	
1852	CAMDEN	N. J.	300,000	100	3	April & October.	15,000	3 85	105	100	
1858	CANANDAIGUA	N. Y.	50,000	50	—	January & July.	3,000	4 00	90	80	
1856	CANTON	O.	19,000	50	6	March & September.	6,000	3 00	....	....	
1853	CAPE ISLAND	N. J.	80,000	100	—	October.	10,000	6 00	....	...	Watering place.—These Works only run in summer.
1860	CARBONDALE	Pa.	16,000	25	—	March & September.	5,000	4 00	....	....	
1855	CARLISLE	Pa.	30,000	25	—	January & July.	4,000	4 00	....	...	
1856	CATASAUQUA	Pa.	15,000	25	5	May & November.	2,000	4 00	....	....	
1858	CATSKILL	N. Y.		—	—	Private Works.	3,000	3 00	....	....	Owned by G. T. Sutton.
1857	CHAMBERSBURG	Pa.	30,000	25	-	January & July.	3,000	4 00	....	....	
1846	CHARLESTON	S. C.	723,800	25	4	Do.	50,000	4 00	....	....	
1851	CHARLESTOWN	Mass.	200,000	50	4	Do.	30,000	3 00	....	....	
1858	CHARLOTTE	N. C.	14,000	50	10	March & September.	3,500	6 00	...	....	
1859	CHARLOTTEVILLE	Vt.	15,000	25	—	Do.	4,000	4 50	....	...	
1851	CHELSEA	Mass.	100,000	100	3½	January & July.	8,000	3 50	....	....	
1856	CHESTER	Pa.	35,000	25	3	April & October.	4,000	4 00	....	....	
1849	CHICAGO	Ill.	1,300,000	25	5	January & July.	100,000	2 50	150	140	Very scarce. Stock wanted.
1857	CHICOPEE	Mass.	50,000	20	—	Do.		4 00	....	....	
1851	CHILLICOTHE	O.	40,000	25	4	Do.	12,000	3 50	....	....	
1841	CINCINNATI	O.	1,600,000	100	5	Do.	225,000	2 50	....	....	
1859	CITIZENS', BROOKLYN	N. Y.	1,000,000	20	—	Do.	185,000	3 00	128	125	
1860	CITIZENS', READING	Mass.	90,000	100	—				....	....	
	CLARKSVILLE	Tenn.	100,000	50	—	Do.	5,000	4 00	....	....	
1860	CLAREMONT	N. H.	20 000	100	—	March & September.	3,000	4 00	....	....	
1846	CLEVELAND	O.	200,000	10	5	January & July.	20,000	3 00	....	....	
1858	CLINTON	Mass.	30,000	500	5	Do.	3,000	4 00	....	...	
1859	CLYDE	N. Y.	10,000	50	4	Do.	2,500	4 00	...	....	
1854	COHOES	N. Y.	50,000	20	3½	April & October.	5,000	3 00	....	....	Formerly Rosin-Gas, but now Coal. A well managed company. Stock firmly held.
1860	COLD SPRING	N. Y.	30,000	50	—	Do.	3,500	4 00	95	....	
1860	COLD WATER	Mich.	25,000	50	5	January & July.	4,000	4 00	....	....	
1852	COLUMBIA	Pa.	37,500	25	—	Do.	4,000	3 50	....	....	
1852	COLUMBIA	S. C.	44,000	25	4	Do.	6,000	6 00	....	....	
1857	COLUMBIA	Cal.	50,000	25	—	Do.	4,500	10 00	....	....	
1858	COLUMBUS	Ga.	54,000	25	5	Do.	5,000	7 00	....	....	
1850	COLUMBUS	O.	100,000	10	6	Do.	30,000	3 00	....	....	
1858	CONCORD	N. H.	50 000	50	5	Do.	8,000	3 50	....	....	
1858	COVINGTON AND NEWPORT	Ky.	100,000	50	3½	Do.	28,000	4 00	...	....	
1854	CUMBERLAND	Md.	60,000	50	3	Do.	6,000	4 00	....	....	
1857	DANBURY	Ct.	50,000	25	4	Do.	2,000	3 75	....	...	
1856	DANVILLE	Pa.	30,000	25	—	June & December.	3,000	4 00	....	....	
1855	DAVENPORT	Iowa.	56,000	100	—	Do.	6,000	5 00	....	....	
1848	DAYTON	O.	50,000	25	5	February & August.	8,000	3 50	....	....	
1858	DEDHAM	Mass.	40,000	50	—	January & July.	3,000	4 00	....	....	
1860	DELAWARE	O.	30,000	25	—	Do.	2,500	3 00	....	....	
1849	DETROIT	Mich.	500,000	50	5	Do.	30,000	3 50	160	150	Excellent Stock. No sales.
1860	DOBBS' FERRY	N. Y.	25,000	—	—	Do.	3,000	4 00	....	....	
1854	DORCHESTER	Mass.	150,000	100	—	Do.	14,000	4 00	....	....	
1859	DOVER	Del.	12,000	—	—	Private Works.	2,000	4 00	....	....	
	DOVER	N. H.				January & July.			....	....	
1857	DOYLESTOWN	Pa.	50,000	—	—	Do.	3,000	4 00	....	....	
1854	DUBUQUE	Iowa.	50,000	115	3½	Do.	17,000	4 50	....	115	This stock is wanted at par.
1858	EAST BOSTON	Mass.	133,000	25	4	Do.	20,000	3 50	....	145	
1858	EAST GREENWICH	R. I.	11,200	100	15	Do.	3,000	7 00	....	....	No transactions.
1861	EAST HAMPTON	Mass.	10,000	25	—	Do.	5,000	9 00	....	....	
1861	EAST NEW YORK	N. Y.	50,000	50	—	Do.	12,000	3 50	....	....	
1857	EASTON	Md.	9,000	10	—	Do.	1,500	7 00	....	....	
1850	EASTON	Pa.	125,000	50	4	June & December.	6,000	3 60	....	....	
1856	EASTPORT	Me.	50,000	55	—	Do.	3,000	4 00	....	....	
1855	ELIZABETH	N. J.	100,000	20	4	January & July.	14,000	3 50	....	....	
	ELLICOTT'S MILLS	Md.	10,000	—	—	Do.	4,000	4 00	....	....	
1852	ELMIRA	N. Y.	50,000	25	3½	Do.	5,000	4 00	....	...	
1852	ERIE	Pa.	68,000	50	3½	June & December.	10,000	3 00	....	....	
1853	EVANSVILLE	Ind.	60,000	50	4	January & July.	12,000	4 00	110	....	A very good Company.
	EXETER	N. H.	60,000	—	—	Do.	12,000		....	...	
	FAIR HAVEN	Ct.	20,000	25		Do.	8,000	4 00	....	....	
1847	FALL RIVER	Mass.	26,000	—	—	Private Works.	12,000	3 50	....	....	
1859	FAYETTEVILLE	N. C.	25,000	100	6	January & July.	7,000	6 00	....	....	
	FIFTH WARD (Milwaukee)	Wis.	50,000	25	—	Do.	10,000	4 00	....	....	
1857	FISHKILL	N. Y.	10,000	20	—	April & October.	1,500	9 00	....	....	
1858	FITCHBURG	Mass.	100,000	50	3	January & July.	5,000	4 00	....	....	Make Petroleum-Gas.
1859	FLEMINGTON	N. J.	20,000	—	—	Do.	3,000	4 00	....	....	
1855	FLUSHING	N. Y.	20,000	50	1½	March & September.	6,500	4 00	...	....	
1856	FOLSOM	Cal.								....	
	FORT WAYNE	Ind.	40,000	25	—	Do.	6,000	4 00	...	...	
1851	FRANKFORT	Ky.	50,000	—	—	City Works.	5,500	4 50	...	....	
1851	FREDERICK CITY	Md.	36,000	100	—	January & July.	5,000	6 70	....	....	
1854	FREDERICKSBURG	Va.	72,500	50	5	Do.	4,500	4 00	....	....	
1858	FREDONIA (Natural Gas)	N. Y.	10,000	100	—	Do.	2,000	4 00	....	....	Unlimited supply of Natural Gas.
1856	FREEPORT	Ill.	20,000	100	—	May & November.	10,000	4 00	....	....	

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When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	FREMONT	O.	25,000	25	—	May & November.	2,000	4 50	....	....	
1858	FULTON	N. Y.	12,000	100	—	Do.	4,000	7 00	....	....	
1855	GALENA	Ill.	70,000	100	—	Do.	8,000	4 00	....	....	
1859	GALION	O.	25,000	25	—	January & July.	1,800	3 00	....	....	
1858	GALVESTON	Texas.	150,000	50	—	May & November.	7,000	6 00	....	....	
1854	GARDINER	Me.	100,000	50	4	Do.	8,000	4 00	....	....	
1853	GENEVA	N. Y.	75,000	25	2½	Do.	6,000	4 00	....	....	
1851	GERMANTOWN	Pa.	Merged	into	the	Philadelphia Works.	12,000	2 25	....	....	
1859	GETTYSBURG	Pa.	20,000	50	3	January & July.	2,500	4 00	....	....	
1854	GLENN'S FALLS	N. Y.	35,000	50	3	February & August.	4,000	4 00	....	....	
1854	GLOUCESTER	Mass.	40,000	50	—	January & July.	5,000	3 50	....	....	
1857	GLOVERSVILLE	N. Y.	15,000	25	—	Do.	3,000	3 50	....	....	
1858	GRAND RAPIDS	Mich.	150,000	20	—	Do.	3,000	4 00	....	....	
1855	GREAT BARRINGTON	Mass.	5,000	100	5	April & October.	2,000	7 00	....	....	
1849	GREAT FALLS	N. H.	50,000	100	3	Do.	3,000	4 00	....	....	
1860	GREENFIELD	Mass.	20,000	50	2	January & July.	2,500	4 00	....	....	Close corporation.
1853	GREENPOINT	N. Y.	100,000	50	5	Do.	20,000	3 00	....	....	
1859	GREENSBORO'	N. C.	12,000	50	—	April & October.	3,000	7 00	....	....	
1858	GREENSBURG	Pa.	30,000	25	3	May & November.	2,000	3 00	....	....	
1854	HAGERSTOWN	Md.	15,000	20	—	January & July.	2,000	6 00	....	....	
	HAMILTON	O.	15,000			Do.			....	....	
1859	HANNIBAL	Mo.	100,000	100	—	Do.	6,000	3 50	....	....	
1857	HARLEM	N. Y.	350,000	50	3½	Do.	25,000	3 00	....	145	
1855	HARRISBURG	Pa.	100,000	—	4	Do.	5,000	4 00	....	....	
1849	HARTFORD	Ct.	200,000	25	4	Do.	25,000	3 00	150	140	Stock in demand.
	HASTINGS	N. Y.				Do.	8,000	4 00	....	....	
1853	HAVERHILL	Mass.	50,000	50	—	Do.	5,000	4 00	....	....	
1859	HAVERSTRAW	N. Y.	20,000	100	—	Do.	5,000	4 00	....	....	
1861	HAVESVILLE	Mass.	15,000	25		Do.	4,000	4 00	....	....	
1859	HEMPSTEAD	N. Y.	16,000	25	—	Do.	1,000	4 00	....	....	
1862	HOBOKEN	N. J.	100,000	25	3	Do.	30,000	2 50	....	100	Works not yet built.
1856	HOLLIDAYSBURG	Pa.	30,000	25	2	Do.	4,000	3 50	....	....	
1861	HOLYOKE	Mass.	20,000	25	—	Do.	3,000	4 00	....	....	
1861	HOMER & CORTLANDT	N. Y.	40,000	100	—	Do.	6,000	4 00	....	....	
1854	HONESDALE	Pa.	30,000	25	3	Do.	2,500	4 00	....	....	
1860	HORNELLSVILLE	N. Y.	12,000	50	—	Do.	2,000	4 00	....	....	
1853	HUDSON	N. Y.	50,000	100	3½	February & August.	3,000	4 00	....	....	
	HUNTER'S POINT	N. Y.									
1857	HUNTINGTON	Pa.	18,000	50	3	Do.	2,000	3 50	....	....	
1856	HUNTSVILLE	Ala.	7,325	25	—	June & December.	2,000	5 00	....	....	
	INDIANAPOLIS	Ind.	150,000	—	—	Do.	15,000	3 00	....	....	
1857	IOWA CITY	Iowa.	40,000	50	—	February & August.	4,000	4 50	....	....	
1852	ITHACA	N. Y.	75,000	25	3½	January & July.	6,000	4 00	....	....	
1857	JACKSON	Mich.	25,000	50	5	Do.	6,000	3 50	....	....	
	JACKSON	Miss.	80,000	50	—	Do.	4,000	4 50	....	....	
	JACKSON	Cal.	50,000	30	—	Do.	4,000	10 00	....	....	
	JACKSONVILLE	Flor.	30,000	20	—	Do.	2,000	7 00	....	....	
	JACKSONVILLE	Ind.	50,000	50	—	Do.	4,000	5 00	....	....	
1858	JACKSONVILLE	Mo.	25,000	25	—	Do.	7,000	6 00	....	....	
1856	JAMAICA	N. Y.	20,000	—	4	Do.	6,000	4 00	....	....	
1853	JAMAICA PLAIN	Mass.	75,000	100	3½	Do.	3,000	3 50	....	....	
	JAMESTOWN	N. Y.	25,000	—	—	Do.	4,000	4 00	....	....	
1856	JANESVILLE	Wis.	50,000	100	—	Do.	12,000	4 00	....	....	
	JEFFERSONVILLE	Md.	30,000	25		Do.	4,000	4 00	....	....	
1858	JERSEY CITY	N. J.	300,000	—	5	Do.	80,000	3 00	150	....	No sales since formation of Hoboken Co.
1858	JERSEY SHORE	Pa.	15,000	25	—	Do.	2,000	3 70	....	....	
1856	JOHNSTOWN	Pa.	80,000	25	3	Do.	8,000	3 00	....	....	
1857	JOLIET	Ill.	300,000	100	—	June & December.	6,000	4 00	....	....	
1858	KALAMAZOO	Mich.	30,000	50	5	Do.	10,000	4 00	....	....	
1860	KEENE	N. H.	60,000	100	—	Do.	4,500	4 00	....	....	
1855	KEOKUK	Iowa.	100,000	100	—	January & July.	10,000	4 50	....	....	
1855	KINGSTON	Pa.	50,000	50	—	Do.	3,000	4 00	....	....	
1859	KITTANNING	Pa.	20,000	—	—	Doubtful.	5,000	4 00	....	....	Said to be a fraud.
1854	KNOXVILLE	Tenn.	63,000	—	—	April & October.	4,000	5 00	....	....	
1860	LACONIA	N. H.	20,000	100	—	Do.	4,000	6 00	....	....	
1859	LA CROSSE CITY	Wis.	100,000	50	—	June & December.	10,000	8 00	....	....	Petroleum and Wood Gas.
1854	LAFAYETTE	Ind.	60,000	50	4	January & July.	10,000	3 25	....	....	
1856	LAMBERTVILLE	N. J.	30,000	25	—	Do.	2,600	4 00	....	....	
1849	LANCASTER	Pa.	100,000	50	4	Do.	10,000	3 00	....	....	
1856	LANCASTER	O.	25,000	100	5	Do.	5,000	3 50	....	....	
1855	LANSINBURG	N. Y.	25,000	100	—	Private Works.	7,000	4 00	....	....	
1849	LAWRENCE	Mass.	200,000	100	4	February & August.	15,000	3 50	....	....	
1859	LEAVENWORTH	Kansas.	200,000	25	—	Private Works.	15,000	4 00	....	....	
1856	LEBANON	Pa.	26,000	50	—	February & August.	5,000	4 00	....	....	
1861	LE ROY	N. Y.	25,000	50	—	Do.	4,000	4 00	....	....	
1858	LEWISBURG	Pa.	20,000	100	—	January & July.	4,000	4 00	....	....	
1852	LEWISTON	Me.	100,000	100	3	Do	10,000	3 20	....	....	
1856	LEWISTOWN	Pa.	30,000	50	3	April & October.	3,000	3 10	....	....	
1853	LEXINGTON	Ky.	100,000	25	4	January & July.	5,000	4 00	....	....	
1853	LITTLE FALLS	N. Y.	112,000	25	—	Do.	3,500	7 00	....	....	
1861	LITTLE ROCK	Ark.	20,000	—	—	Do.	5,000	6 00	....	....	
1858	LOCKHAVEN	Pa.	28,000	—	—	Do.	3,000	4 00	....	....	
	LOCKPORT	N. Y.	100,000	50	—	Do.	4,000	4 00	....	....	
	LOGANSPORT	Ind.	40,000		5	April & October.	5,000	4 00	105		But $481,400 stock has been sold. This Company has a large contingent fund and undivided profit on hand.
1838	LOUISVILLE	Ky.	600,000	50	6	January & July.	80,000	2 50	125	....	
1849	LOWELL	Mass.	200,000	25	5	Do.	50,000	3 25	....	....	
1852	LYNCHBURG	Va.	70,000	25	5	Do.	6,000	3 80	....	....	
1852	LYNN	Mass.	55 000	50	4	Do.	20,000	4 00	....	....	
1859	LYONS	N. Y.	30,000	100	—	Do.	4,000	4 00	....	....	
1852	MACON	Ga.	75,160	25	6	Do.	5,000	5 00	....	....	
1851	MADISON	Ind.	160,000	25	3	Do.	10,100	3 50	....	....	
1855	MADISON	Wis.	100,000	25	—	Do.	5,000	5 00	....	....	
1854	MALDEN & MELROSE	Mass.	50,600	25	3	February & August.	5,000	4 00	....	....	
1852	MANAYUNK	Pa.	40,000	100	—	Do.	7,000	4 00	....	....	
1852	MANCHESTER	N. H.	100,000	100	5	January & July.	25,600	3 00	....	....	
1830	MANHATTAN (N. Y. City)	N. Y.	4,000,000	50	5	Do.	600,000	2 50	....	....	
	MANSFIELD	O.	25,000	—	—	Do.	10,000	4 00	....	....	
1854	MARBLEHEAD	Mass.	40,000	100	3	Do.	1,000	4 00	....	....	
	MARLBORO'	Mass.	20,000	—	—	Do.	8,000	4 00	....	....	
	MAUCH CHUNK	Pa.	50,000	50	—	Do.	7,000	4 00	....	....	
1857	MARIETTA	O.	50,000	50	—	Do.	7,000	4 00	....	....	Stock firm.
1860	MARION	O.	12,000	25	5	April & October.	1,500	13 55	....	....	
1858	MARYSVILLE	Cal.	50,000	100	—	January & July.	4,000	2 50	....	....	
1857	MASSILON	O.	20,000	25	—	Do.	5,000	3 00	....	....	
1855	MEADVILLE	Pa.	39,500	25	—	Do.	4,000	3 50	....	....	
	MEDINA	N. Y.	2,000	100	—	Do.	2,000	7 00	....	....	
1852	MEMPHIS	Tenn.	300,000	100	5	June & December.	12,000	3 50	....	....	
	MERIDEN	Ct.	20,000			Do.			....	....	
1859	METROPOLITAN (N. Y. City)	N. Y.	1,000,000	100	—	January & July.	200,000	2 50	....	....	
1859	MIDDLEBORO'	Mass.	15,000	—	—	Private Works.		6 00	....	....	
1858	MIDDLETOWN	Ct.	50,000	25	3	March & September.	5,000	3 80	....	....	Owned by G. T. Sutton.
	MIDDLETOWN	N. Y.		25	—	Private Works.	3,000	3 00	....	....	
	MILFORD	Mass.	20,000	—	—	Do.		4 00	....	....	
	MILLEDGEVILLE	Ga.	100,000	50	—	Do.		5 00	....	....	
	MILTON	Pa.	10,000			Do.			....	....	
1847	MILWAUKEE	Wis.	400,000	50	5	January & July.	24,000	3 50	150	....	
1852	MOBILE	Ala.	200,000	—	—	Do.	30,000	4 50	....	....	
1856	MONROE	Mich.	40,000	50	—	Do.	5,000	3 50	50	....	
1852	MONTGOMERY	Ala.	100,000	25	4	February & August.	7,000	6 00	....	....	
1856	MONTPELIER	Vt.	30,000	25	3	January & July.	5,000	4 50	....	....	
1859	MORRISANIA	N. Y.	30,000	50	—	Do.		4 00	....	....	
1859	MORRISTOWN	N. J.	18,000	50	—	Do.	3,500	4 00	....	....	
1854	MOUNT HOLLY	N. J.	16,650	25	3	April & October.	2,000	7 00	....	....	
	MOUNT VERNON	O.	50,000	100	—	Do.		4 00	....	....	
1857	MUSCATINE	Iowa.	50,000	100	—	January & July.	3,000	4 50	....	....	
1854	NANTUCKET	Mass.	50,000	100	3	February & August.	6,000	4 00	....	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1852	Nashua	N. H.	45,000	50	3½	January & July.	10,000	3 50	....	....	
1850	Nashville	Tenn.	200,000	50	5	Do.	25,000	3 50	....	...	
1858	Natchez	Miss.	46,000	50	—	Do.	20,000	5 00	...	...	
	Nevada City	Cal.							....	....	
1852	New Albany	Ind.	200,000	50	3½	Do.	16,000	3 50	....	...	
1846	Newark	N. J.	362,000	50	5	Do.	45,000	3 62	130	...	Always a favorite stock.
1856	Newark	O.	30,000	100	—	Do.	7,000	5 40	....	....	
1852	New Bedford	Mass.	130 000	100	5	Do.	15,000	2 90	102	...	Well managed and kept quiet.
1859	Newbern	N. C.	22,000	100	6	Do.	6,000	3 50	....	....	
	New Britain	Ct.	30,000	20	5	Do.	3,000	4 00	...	....	
1851	New Brunswick	N. J.	100,000	20	4	Do.	8,000	3 00	115	....	
1852	Newburg	N. Y.	67,000	20	4	Do.	10,000	4 00	105	....	
1852	Newburyport	Mass.	150,000	10	4	Do.	9,000	4 00	92½	....	
1857	Newcastle	Del.	$2,300	10	3	Do.	4,000	4 00	90	....	
1847	New Haven	Ct.	250,000	25	4	Do.	30,000	3 00	155	....	None in market.
1853	New London	Ct.	70,000	50	3	Do.	12,000	4 00	105	....	
1835	New Orleans	La.	1,500,000	100	6	Do.	120,000	4 00	180	....	
1853	Newport	R. I.	130,200	100	4	Do.	10,000	3 50	112	....	
1854	Newton & Watertown	Mass.	300,000	100	2	Do.	10,000	4 00	....	....	
	Newton	N. J.	30,000	—	—	Do.	3,000	4 00	....	....	
	Newton	Pa.	20,000	50	—	Do.	2,500	4 00	....	....	
	Newtown	N. Y.									
1828	New York	N. Y.	1,000,000	50	5	May & November.	100,000	2 50	300	....	
1859	Niagara Falls	N. Y.	15,000	25	—	Do.	3,000	4 00	90	...	
	Norfolk	Va.	60,000	25	—	Do.	40,000	4 00	....	....	
1858	Norristown	Pa.	41,700	25	4	June & December.	8,000	3 50	....	....	
1855	North Attleboro'	Mass.	50,000	100	3½	Do.	6,000	4 00	....	....	
	Northern Liberties	Pa.	400,000	25	7	City Works.	40,000	2 50	....	....	
	North Adams	Mass.	25,000	—	—	March & September.	30,000	4 00	....	..	
1856	Northampton	Mass.	35,000	25	3	January & July.	4 500	4 00	....	....	
1859	North Bridgewater	Mass.	16,000	100	4	June & December.	1,000	7 00	....	....	
1856	Norwalk	Ct.	30,000	150	4	February & August.	6,000	4 00	....	....	
1859	Norwalk	O.	30,000	25	—	January & July.	4,000	4 00	....	....	
1854	Norwich	Ct.	75,000	25	3½	Do.	12,000	3 50	....	....	
1861	Norwich	N. Y.	12,000	50	—	Do.	2,500	4 00	....	....	
1859	Nyack	N. Y.	20,000	100	—	Do.	2,500	4 00	....	....	
1860	Oberlin	O.	10,000	—	—	Do.	1,200	4 00	....	...	
1855	Ogdensburg	N. Y.	75,000	50	5	Do.	9,000	4 00	....	..	
1859	Orange	N. J.	65,000	25	—	Do.	6,000	3 50	....	....	
1852	Oswego	N. Y.	81,250	100	3½	Do.	15,000	4 00	105	....	
1855	Ottawa	Ill.	45,000	100	6½	Do.	6,000	4 00	....	....	Good works, built by Hoy, Jr., & Kennedy.
1856	Owego	N. Y.	40,000	50	3½	Do.	5,000	4 00	....	....	
1860	Owensboro'	Ky.	25,000	25	—	Do.	4,000	3 50	....	....	
1856	Paducah	Ky.	75,000	100	—	May & November.	4,000	5 00	....	....	
1861	Painsville	O.	40,000	25	5	Do.	2,500	5 00	....	..	
1856	Palmyra	N. Y.	12,000	25	—	January & July.	3,000	7 00	....	....	
1847	Paterson	N. J.	125,000	25	3	Do.	20,000	3 50	95	....	
1850	Pawtucket	R. I.	75,000	50	4	Do.	12 000	3 00	....	....	
1855	Peekskill	N. Y.	31,000	50	3	June & December.	4,000	4 00	....	....	Surplus $10,000, May 15, 1863.
1860	Penn Yan	N. Y.	12,000	50	5	Do.	3,000	4 00	....	....	Works leased to Gilbert T. Sutton.
1859	Peoples', Chicago	Ill.	500,000	50	New	Do.	100,000	2 50	....	....	
1855	Peoria	Ill.	100,000	50	4	Do.	8,000	3 50	....	....	What is this Company doing?
1852	Petersburg	Va.	120,000	—	5	January & July.	20,000	3 80	....	....	
1841	Philadelphia	Pa.	3,000,000	50	—	City Works.	650.000	2 50	....	....	
1855	Piqua	O.	50,000	50	—	January & July.	6,500	4 00	....	....	
1853	Pittsburg	Pa.	300,000	100	5	Do.	60,000	1 50	115	....	
1854	Pittsfield	Mass.	50,000	100	5	Do.	4,500	4 00	....	....	
1858	Placerville	Cal.	30,000	50	—	Do.	4,500	10 00	....	....	
1860	Plainfield	N. J.	25,000	50	—	Do.	2,500	4 00	....	....	
1859	Plattsburg	N. Y.	16,000	50	—	January & July.	5,000	7 00	....	....	
1853	Plymouth	Mass.	40,000	100	—	April & October.	8,000	4 00	....	....	
1860	Port Chester	N. Y.	50,000	50	—	Do.	4,000	4 00	....		
1860	Port Jervis	N. Y.	20,000	100	—	Do.	3,000	4 10	....	...	
1849	Portland	Me.	300,000	50	4	January & July.	80,000	3 00	....	....	
1859	Portland	Oreg.	50,000	50	—	Do.	3,500	8 00	....	....	
1859	Port Lavacca	Texas.	50,000	100	—	Do.	2,500	7 00	....	....	
1851	Portsmouth	N. H.	70,000	100	8	April & October.	6,500	3 70	....	....	
1855	Portsmouth	O.	50,000	50	4	January & July.	10,000	3 50	....	....	
1856	Portsmouth	Va.	100,000	50	4	Do.	4,000	4 00	....	....	
1850	Pottstown	Pa.	20,000	50	3	Do.	3,500	4 00	....	....	
1850	Pottsville	Pa.	110,000	50	2	Do.	10,000	3 50	....	....	
1848	Poughkeepsie	N. Y.	84,000	25	4	March & September.	15,000	3 50	120	110	
	Providence	R. I.	1,000,000	50	4	January & July.	60,000	3 00	122	....	
1858	Quincy	Ill.	300,000	50	4	June & December.	12 000	3 50	....	....	
	Quincy	Mass.	00,000	00	—	Do.	00,0-0	0 00	....	....	
1855	Racine	Wis.	48,500	26	—	Do.	7,000	3 50	....	....	
1857	Rahway	N. J.	50,000	20	—	January & July.	5,000	4 00	....	....	
1858	Raleigh	N. C.	25.000	100	6	May & Novrmber.	5,000	6 00	....	....	
1848	Reading	Pa.	100,000	25	4	January & July.	25,000	3 00	....	....	
1851	Richmond	Va.	341.975	—	—	City Works.	30,000	3 00	....	....	
1859	Richmond	Mass.	40,000	25	—	January & July.	3,000	4 00	....	....	Jeff. Davis has extinguished the gas-lights of Richmond, Va.
	Richmond County	N. Y.									
1859	Ripley	O.	25.000	50	—	April & October.	2,000	4 00	....	....	
1852	Rochester	N. Y.	200,000	50	5	January & July.	50,000	2 50	....	....	
1857	Rockford	Ill.	40,000	50	—	Do.	4,000	4 00	....	...	
1854	Rock Island	Ill.	100,000	50	—	Do.	6,000	4 50	....	....	
1854	Rockland	Me.	50,000	100	—	Do.	6,000	4 40	....	..	
1852	Rome	N. Y.	85,000	100	3½	Do.	10,000	3 60	....	....	
1854	Rondout and Kingston	N. Y.	65,150	20	3½	June & December.	10,000	3 80	....	....	
1854	Roxbury	Mass.	150,000	100	5	January & July.	20,000	3 50	....	....	
1859	Rutland	Vt.	20,000	25	—	Do.	4,000	3 50	....	....	
	Saco	Me.	71,600	100	3½	April & October.	8,000	4 00	....	....	
1857	Sacramento	Cal.	500,000	100	—	Do.	40,000	10 00	....	....	
1859	Sag Harbor	N. Y.	20,000	—	—	Do.	4,000	4 00	....	....	
1858	Saint Albans	Vt.	15,000	20	—	Do.	3,000	7 00	....	....	
	Saint Johnsbury	Vt.	30,000	25	—	Do.	4,000	4 00	....	....	
1857	Saint Joseph	Mo.	50,000	100	5	January & July.	6,000	5 00	....	....	
1859	Saint Louis	Mo.	600.000	50	—	June & December.	180.000	3 50	....	....	
1857	Saint Paul	Min.	200,000	50	3	January & July.	10.000	6 00	....	....	Surplus $10,000, May 15, 1863.
1856	Salem	N. J.	30,000	25	3	Do.	5,000	3 86	....	....	
1850	Salem	Mass.	200.000	100	4	February & August.	30,000	3 24	..	....	
1859	Salem	O.	25,000	20	—	Do.	3,000	3 00	....	....	
1859	Salisbury	N. C.	14,600	50	6	May & November.	3,500	6 00	....	...	
	Salisbury Mills	Mass.	1,250	25	—	Do.	3,000	4 00	....	....	
	Salmon Falls	Me.	25,000	100	—	Do.	3,000	4 00	....	....	
	San Antonio	Texas.	75,000	20	—	Do.	40,000	6 00	....	....	
1854	Sandusky	O.	75,000	50	—	April & October.	9,000	3 00	....	....	
1859	Sandwich	Mass.	10,000	—	—	Private Works.	2,000	3 50	....	....	
1852	San Francisco	Cal.	2,000,000	100	4½	Do.	100,000	6 50	100	....	
	San Jose	Cal.							....	....	
1858	Saratoga Springs	N. Y.	89,000	100	—	January & July.	6,000	3 60	70	....	
	Saugerties	N. Y.	30,000	20	—	Do.	4.000	3 00	....	....	
1849	Savannah	Ga.	200,000	25	5	Do.	10,000	3 75	....	....	
1851	Schenectady	N. Y.	50,000	—	—	Private Works.	11,000	4 00	....	....	
1858	Scranton, Gas and Water	Pa.	100,000	25	—	January & July.	6,000	3 80	....	....	About trying Water-Gas.
1857	Selma	Ala.	20,000	100	—	Do.	2,000	5 00	....	....	
1856	Seneca Falls and Waterloo	N. Y.	80,000	50	3	Do.	10,000	4 00	100	....	
	Shreveport	La.	40,000	25	—	Do.	3,000	6 50	....	....	
1856	Sing Sing	N. Y.	40,000	100	—	Do.	3,000	3 50	....	....	
	Smyrna	Del.						4 00	....	....	Petroleum Gas.
1860	South Adams	Mass.	10,000	25	—	Do.	3,000	4 00	....	....	
1859	South Bridge	Mass.	5,000	25	—	Do.	4,010	6 00	....	....	
	South Boston	Mass.	200.000	50	—	Do.	60,000	3 25	110	....	
	Springfield	O.	200,000	100	—	Do	20,000	3 50	....	....	
1854	Springfield	Ill.	75.000	50	—	January & July.	10,000	3 50	....	....	
1848	Springfield	Mass.	100,000	500	5	February & August.	10,000	3 60	140	....	
1858	Stamford	Ct.	6,250	25	5	April & October.	3,000	3 50	....	....	
1857	Staten Island	N. Y.	150,000	50	5	January & July.	26,000	4 00	95	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	Staunton	Va.	18,000	50	6	January & July.	4,000	7 00	....	....	
	Steubenville	O.	150,000	100	—	Do.	15,000	4 00	....	....	
	Stockton	Cal.	50,000	-	—	Do.	8 000	10 00		....	
1848	Syracuse	N. Y.	125,000	25	5	March & September.	25,000	3 00	112	....	
	Tamaqua	Pa.	40,000	25	—	Do.	3 000	4 00	...	....	
1850	Tarrytown and Irvington	N. Y.	70,000	50	—	January & July.	3,000	4 00	....	....	
1853	Taunton	Mass.	100,000	50	4	Do.	10,000	4 00	....	....	
	Terre Haute	Ind.	100,000	100	—	Do.	3,000	4 00	....	....	
	Thompsonville	Ct.	25,000	50	—	Do.	4,000	4 50	....	....	
	Tiffin	O.	25,000	20	—	Do.	4,000	4 00	....	....	
1859	Toledo	O.	100,000	50	3	Do.	8,000	3 50	....	....	
1847	Trenton	N. J.	100,000	20	4	Do.	15,000	3 42	....	110	
1848	Troy	N. Y.	200,000	100	4	June & December.	35,000	3 00	160	....	
1856	Urbana	O.	30,000	25	—	April & October.	3,500	4 00	....	....	
1849	Utica	N. Y.	80,000	100	4	Do.	22,000	3 60	....	....	
1858	Vicksburg	Miss.	66,000	50	—	March & September.	4,000	4 50	....	....	
1859	Vincennes	Ind.	25,000	100	—	January & July.	2,000	4 00	....	....	
1863	Virginia City.	N. T.					20,000				
1858	Walden	N. Y.	2,500	—	—	Private Works.	1,000	6 00	....	....	
1853	Waltham	Mass.	100,000	100	4	January & July.	3,000	4 00	....	....	
1857	Ware	Mass.	30,000	20	—	Do.	3,500	4 00	....	....	
1861	Warren	O.	30,000	50	—	Do.	4,000	3 00	....	....	
1854	Warren	R. I.	20,000	25	—	Do.	3,000	4 00	....	....	
1855	Washington	D. C.	500,000	20	5	Do.	50,000	2 61	150	148	
1859	Washington	N. C.	15,000	100	—	April & October.	1,500	6 00	....	...	
1848	Washington	Pa.	20,000	25	4	January & July.	4,000	3 00	....	....	
1854	Waterbury	Ct.	100,000	25	—	Do.	4,000	4 00	....	....	
1852	Waterford	N. Y.	12,000	25	—	Do.	4,000	4 00	....	....	
1852	Watertown	N. Y.	20,000	100	—	Do.	10,000	7 00	....	....	
1856	Watertown	Wis.	25,000	100	—	Do.	5,000	5 00	....	....	
1858	Wautoma	Wis.	30,000	50	—	Do.	3,000	4 50	....	....	
1857	Waverly	Miss.	20,000	100	—	April & October.	4,000	5 00	....	....	
1854	West Cambridge	Mass.	60,000	100	—	February & August.	10,000	4 00	....	....	
1852	Westchester	Pa.	100,000	25	2½	Do.	3,500	3 50	....	....	
	Westfield	Mass.	25,000	100	3	Do.	4,000	4 00	....	....	
	Weston	O.	20,000	25	—	Do.		5 00	....	....	
1857	West Point	N. Y.	50,000	—	—	United States Military	Academy.	2 60	....	....	
1853	West Troy	N. Y.	100,000	50	3	January & July.	10,000	3 60	85	....	
1850	Wheeling	Va.	75,000	25	6	Do.	12,000	2 70	....	....	
	White Plains	N. Y.	20,000	20	—	Do.			....	....	
1856	Wilkesbarre	Pa.	50,000	50	—	May & November.	4,000	3 38	100	80	
1850	Williamsburg	N. Y.	1,000,000	50	5	January & July.	60,000	3 00	....	....	
1858	Williamsburg	Va.	30,000	25	—	Do.	3,000	4 00	....	....	Camp-fires of the Union Army light up this place at present.
1857	Williamsport	Pa.	70,000	25	4	Do.	3,500	3 80	....	....	
1859	Willimantic	Ct.	12,000	—	—	Do.	2,500	3 50	....	....	
1858	Wilmington	N. C.	60,000	50	5	Do.	8,000	5 00	....	....	
1852	Wilmington	Del.	200,000	50	5	February & August.	20,000	3 00	....	....	
1854	Winchester	Va.	36,000	50	6	January & July.	5,000	4 00	....	....	
1861	Windsor	Vt.	20,000	25		Do.	2,000	6 00			Make Petroleum Gas.
	Woburn	Mass.	20,000	—	—	Do.	3,000	4 00	....	....	
1856	Woodstock	Vt.	10,000	50	4	Do.	4,000	6 00	....	....	
1853	Woonsocket	R. I.	82,600	100	4	April & October.	4,000	3 50	....	....	
1856	Wooster	O.	25,000	50	—	January & July.	6,000	3 00	....	....	
1849	Worcester	Mass.	160,000	100	5	Do.	15,000	3 50	....	....	
1855	Xenia	O.	40,000	50	—	Do.	8,000	4 00	....	....	
1854	Yonkers	N. Y.	100,000	50	3½	Do.	10,000	3 50	110	16½	
1849	York	Pa.	40,000	57	3	June & December.	10,000	3 50	....	....	
	Yorkville	S. C.	20,000	25	—	Do.	4,000	4 00	....	....	
1858	Ypsilanti	Mich.	20,000	50	5	February & August	6,000	14 00	....	....	
1850	Yreka	Cal.	20,000	100	—	Do.	2,000	0 00	....	....	
1848	Zanesville	O.	44,600	25	4	Do.	10,000	3 00	....	....	

GAS-LIGHT COMPANIES IN THE BRITISH PROVINCES OF NORTH AMERICA.

When Chartered.	Town.	Province	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1854	Belleville	C. W.	33 040	100	4	January & July.	1,200	5 00	....	....	
1854	Brantford	C. W.	32,000	100	2½	Do.			....	....	
	Brockville	C. W.	50,000	—	—	Do.	5,000	4 00	....	....	
	Chatham	N. B.	50,000	—	—				....	....	
1854	Charlotte Town	P. E. I.	50,000	100	5	Do.	3,000	3 50	....	....	
1857	Cobourg	C. W.	30,000	—	-	February & August.	4,000		....	....	
	Dundas	C. W.	30,000	—	—	Do.	6,000	4 00	....	....	
	Frederick	N. B.	50,000	—	—	Do.			....	....	
1843	Halifax	N. S.	160,000	20	7	May.	30,000	3 00	....	....	
1850	Hamilton	C. W.	125,000	40	5	March & September.	20,000	3 50	....	....	
1848	Kingston	C. W.	80,000	100	—	Do.	6,000	3 50	....	....	
1858	London	C. W.	100,000	20	5	May & November.	5,000	5 00	....	....	
1847	Montreal	C. E.	400,000	40	—	March & September.	110,000	2 80	....	118	Last sale at this figure.
1854	Ottawa	C. W.	40,000	40	5	Do.	5,000	4 50	....	...	
1859	Point Levi	C. E.	25,000	25	—	January & July.	4,000	3 50	....	....	
1859	Port Hope	C. W.	28,000	20	4	May & November.	4,500	3 50	....	....	
1847	Quebec	C. E.	200,000	200	4	January & July.	60,000	3 00	....	....	
1848	Saint Catherine's	C. W.	80,000	20	—	May & November.	7,000	4 50	....	....	
1859	Saint Hyacinthe	C. E.	15,000	20	—	Do.	4,000	4 00	....	....	
	Saint John	N. B.	170,000	83	4	June & December.	25,000	3 00	110	110	Sales at this figure.
	Saint John's	N. F.	50,000	—	4	Do.	30,000		....	....	
1858	Sorel	C. E.	14,000	20	4	Do.	4,000	3 00	...	....	
1848	Toronto	C. W.	400,000	50	—		50,000	3 00	....	....	This Co. pay a quarterly div. of 2 per ct.

GAS-LIGHT COMPANIES IN CUBA, MEXICO, SOUTH AMERICA AND NEW ZEALAND.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
	Callao	Chile.		—	—	January & July.	20,000	7 00	....	....	
	Cardenas	Cuba.	50,000	—	—	Do.	180,000	5 00	....	....	
1857	Compania Cubana	Hav'a.	500,000	500	10	Do.			....	....	
	Cienfugos	Cuba.		—	—	Do.	12,000	5 00	....	....	These four towns are lighted by the Compania Cubana of Havana.
	Guanabacoa	Cuba.		—	—	Do.	14,000	5 50	....	....	
	Regla	Cuba.		—	—	Do.	10,000	5 00	....	....	
	Trinidad	Cuba.		—	—	Do.	10,000	5 00	....	....	
	Guines	Cuba.		—	—	Do.			....	....	
	Guyaquil	S. A.	150,000	—	—	Do.	35,000		....	....	
	Havana	Cuba.	2,000,000	500	—	Quarterly.	200,000	5 00	....	175	
	Lima	Peru.	100,000	—	—	January & July.	150,000		....	....	
	Maranham (Chartered)			—	—	Do.			....	....	
	Matanzas	Cuba.	50,000	—	—	Do.	180,000	8 50	....	....	
	Mexico City	Mex.	550,000	—	—	Do.			....	....	
	Montevideo	S. A.	500,000	—	—	Do.			....	....	
	Para (Chartered)			—	—	Do.			....	....	
18 4	Rio de Janeiro	S. A.	1,000,000	500	7½	Do.	800,000	4 00	...	....	
	San Iago	Chile.	500,000	—	—	Do.	180,000	7 00	....	....	
1857	Saint Jago de Cuba	Cuba.	450,000	500	—	Do.	25 000	5 00	....	....	
	Valparaiso	Chile.	500,000	—	—	Do.	85,000	6 00	.. ..	....	
	Vera Cruz	Mex	500,000	—	—	Do.			....	....	
	Ville Clara	Cuba.	50,000	—	—	Do			....	....	
	Auckland	N. Z.		—	—	Do			....	....	

THE GAS GRIEVANCE.

EXPERIENCE OF PATERFAMILIAS—THE CONSUMER AND THE MANUFACTURER.

It is an undoubted fact that the more we get—whether of money, comfort, drink or real estate—the more we want, and folks who now-a-days enjoy the inestimable and cleanly luxury of gas will get into a far greater rage over some temporary disarrangement of the pipes than their fathers and mothers did over whole years of struggle with oil and tallow.

Winter and thermometrical zero usually bring an amount of gas grievances. The meters freeze up, and as candles and lamps are always unusual articles in the household of a regular city gas consumer, much annoyance and inconvenience result. Servant girls scuffle out of areas to the corner grocery, and candlesticks which for months have stood in solemn state on the chimney-piece, suddenly learn that it is not all of life to be merely ornamental. Then there is always a grim suspicion that the gas companies are charging exorbitant prices, are paying tremendous dividends, and are in league against the consumer. Thus does gas, with all its benefits, bring its share of misery.

A correspondent, who declares he is not one of the complaining kind, sends us some amusing particulars of his gas experience, and we prefer to let him make them public in his own words. He says:

"In my grievances with the Manhattan there is some humor as well as hardship.

"When the cold snap came on, with an exposed cellar and unprotected meter, our gas for two evenings reminded us of Hood's—

> "'We thought her dying when she slept,
> And sleeping when she died;'

for it came and went bibulously, and the third evening it *went out*, and your humble servant came to his cherished home to be greeted with a complacent sperm candle in the hall, like a taper on a big funeral occasion. My wife and I agreed that it was the husband's business to go directly to the corner of Fifteenth street and Irving Place for help. Accordingly, the husband *went out*. Arriving, he said: 'I suspect, sir, our meter is frozen, and we wish you to send some one right up to see about it.' 'I haven't the least doubt of it, sir, not the least,' said a good-looking, greyish-haired gentleman a few desks towards the centre of the room, sticking to his figures, which he seemed to be adding, and scarcely looking up to see who was talking to him. 'Well, you will send a man at once, I suppose, then?' 'Not at all—that is not our business. You must go to your plumber; we have nothing to do about the meters freezing.' 'Well, then,' said I, 'it at least ought to be part of your business to tell people how to protect their meters from freezing.' 'I don't know anything about gas, and don't want to; that's it exactly. Just look on your bills, and you will see directions how to take care of your meter.' So I went to the plumber. When I got home my wife and I looked at the bill for instruction. There is not a word about protecting meters from the frost on it.

"But we yielded about as gracefully as a certain Major-General did when he sacrificed his 'private happiness.'

"About a week after, a strong smell of the inflammable fluid was perceptible in the cellar. The morning after the discovery, we applied at once to the Manhattan headquarters. This time we had the pleasure of dealing with the smiling gentleman who sits square to the front as you enter. He is an energetic, enterprising man, with a brisk movement on the street, and an executive talent which is first-rate, though his hair is whitish. The stockholders know their man in his case, most undoubtedly. We confess that we like him.

"As I entered, and leisurely approached this gentleman's desk, confident in the justness of my errand, a modest-looking man, quiet in his ways, as if he was a good husband and thrifty householder, was just preparing for a retreat, as if vanquished in his encounter. I heard him say, 'Oh, no doubt of it; not the least doubt of it in the world; every word you say is true, but we can't help you.' 'But I suppose, from the rattling, bubbling noise, there may be some water in the pipe,' said the quiet man. 'Precisely so—water in the service-pipe; no doubt of it; we can't help you; let your plumber take the meter off, and bring it here, and if it has not been frozen or tampered with, and if the fault is in the meter, we will fix it, and your plumber may then take it back and adjust it to your pipes; but we can't send anybody to see it.' And the quiet man withdrew.

"Our case seemed to come within the rule laid down, and the prospect was not so encouraging as when we thought we had a good cause and justice on our side. 'You are getting pretty independent now-a-days,' said I, feeling a little cross, and looking the office gentleman straight in the face. 'Ahem,' he replied, with a sharp, quick cock of his half-shut eye towards me, as if simply to classify my consequence, and then turned to the opposite side of the desk to another applicant: 'Look here, my friend,' said I, 'supposing the gas-meter leaks?' 'Why, then it does,' said he. 'You send somebody up to see, don't you?' 'Not at all; that isn't our business.' 'What is your business?' Not a word of reply out of his head. I found this style of operating was of no use. So I moderated somewhat. 'What had I better do about it?' said I. 'Why, do as others have to do; go to your plumber; tell him to bring your meter down here, and if we find that the meter has not been frozen or tampered with, and there is any fault in the meter, we will regulate it, and then the plumber can take it back and set it up again. We haven't the least doubt that it leaks.'

'This was a little to steep,' said I, squaring my position into a firm stand. 'Two years ago you didn't do this way; when you were asked to send a man you sent him, without any ifs or ands about it. Why can't you now?' Not a word in reply out of his head. I waxed warm. 'I'll go into the newspaper,' looking considerably wrathy. 'Perhaps,' said the smiling individual, very coolly, 'you couldn't do better.' 'Or,' said I, waxing warmer and looking crosser, 'I will go to Albany, and get your concern straightened out there,' buttoning the top button of my coat as if I had closed the contest to his discomfiture. Smiling smoother than ever, he replied: 'Albany is an excellent place to go to if a man has only got money enough.'

"This last round finished up your subscriber, and he threw up the sponge. He followed in the tracks of the modest man, who left off where he begun. There was one thing, however, in reserve, and that was a lawsuit. So I went down town, after going to my plumber's, full of a 'judicial determination of the rights of gas consumers'—'Blank *vs.* The Manhattan Gas Company—Judgment for plaintiff—damages, with costs.' Costs! 'Aye, there's the rub.' But the question was this: 'Can a private consumer, who has been *tampered with*, sue the Manhattan Gas Company?' On the authorities, and after consultation, it was concluded that the consumer could sue; but it was equally clear that the company would not stay sued; that the plaintiff would be thrown out of court, while he would have to pay the costs of the suit by throwing them in the Manhattan lawyer's pocket. A pleasant rub for him.

"For the truth in the case is this—and the people who have these chronic gas complaints ought to understand it, for the repose of their worrying souls, since their bodies are dead, so far as any other relief is concerned:

"The Manhattan Gas Company, whose stock ranges between $250 and $300 per share (par value $100 per share), is perfectly and purely irresponsible to the private citizen, any way he can fix it, and the directors know it.

"An existing contract (to expire in 1868) between the company and the city government requires the company to furnish the city or public places with gas, and that is all there is about it. There is not a single allusion to the citizen or private consumer in the contract. The company can double its rates to-morrow, and nobody can help it. Here is an extraordinary franchise granted to a corporation without a stipulation in it for the protection of private rights.

"Just at this time there happens to be a pleasant little set-off to this greed and greatness, in the shape of a big leak on one corner of Madison Square, rendering the neighborhood odorous, besides affording a fine opportunity for social conversation amongst the neighbors themselves. We have resolved not to *send a man* to tell the company a word about it, lest he should *be tampered with*, and his reputation be thereby damaged, at the headquarters of the company. They may find out their own leaks in their own way, and if they don't find them out at all, why then, perhaps our meters won't be tampered with by the company. A gentleman who has not been tampered with was heard to say that he hoped the company might lose about $10,000 worth of gas, provided the company would not feel bound to tamper with the meters, so as to compensate their loss by this leak in the street.

GASTRIC."

PHENIC ACID.

Its Action on Vegetables, Animals, Ferments, Poisons, Virus, Miasmas, and its Applications to Hygiene, to Therapeutics, and to the Anatomical and Industrial Sciences.

BY M. LE DOCTEUR JULES LEMAIRE.

As the subject treated of in these papers is of considerable practical importance, we shall present our readers with a short abstract of them.

Phenic acid ($C_{12}H_6O,HO$) was discovered in 1834 by Runge, who has given it the name of carbolic acid. Laurent, who studied this body, and described many of its combinations, designates it under the name of phenic and hydrate of phenyle, because he objects to place it among the acids. Gerhardt gave it the name of phenol. It has also received the names of phenic alcohol, of spyrol, and of salicone. [In this country the acid is best known in trade as carbolic acid.]

It has been formed synthetically by M. Berthelot, by passing alcoholic or acetic acid vapors through a porcelain tube heated to redness. The acid is also obtained in the dry distillation of benzoin, quinic acid, the resin of xanthorrœa hastilis, castoreum, and chromate of pelosine. Gerhardt has obtained it from salicylic acid by the action of lime or baryta. Stædeler has found that the urine of man, the horse and cow contain it in quantities easily perceivable. It exists also in commercial creasote; but it is from the oil from gas tar, which contains it in considerable quantity, that it is obtained.

Preparation.—The oil from coal tar is submitted to fractional distillation. The part which passes over between 160° and 190° is treated with a hot saturated solution of caustic potash and some powdered potash. A mass of crystals is thus obtained, which may be separated by decantation of the fluid.

When this mass is dissolved in water the solution separates into two layers, one light and oily, the other heavy and watery. The latter is separated, and treated with hydrochloric acid, which sets free the carbolic acid. To obtain it pure, it must be digested with fused chloride of calcium and re-distilled once or twice. After several rectifications, and by cooling slowly, it can be obtained in a solid, colorless crystalline mass.

The pure acid has an odor resembling creasote; the specific gravity = 1.065. It burns with a reddish flame; boils between 187° and 188°. It does not redden litmus, only making an oily stain on the paper. It is soluble to some extent in water, but is very soluble in alcohol, ether, and acetic acid, as well as in glycerine and the fixed and volatile oils.

The pure acid acts energetically on the skin. A weak aqueous solution coagulates albumen and the blood, and acts as a strong antiseptic. Putrid meat and fish, fæcal matters and fermented urine instantly lose their disgusting odor, when immersed in or treated with the solution.

Chemically, phenic acid is a weak acid. It combines with metallic oxides, but the salts have little stability; carbonic acid decomposes them. Those with an alkaline base have always an alkaline reaction.

In consequence of the supposed little solubilty of carbolic acid in water, it has hitherto been chiefly employed mixed with powders, as in the case of Smith and McDougall's disinfecting powder; but the author of these papers has, by careful experiments, determined that the pure acid is sufficiently soluble in water for the solution to possess the power of coagulating albumen, of arresting or preventing spontaneous fermentation, and consequently of destroying infection. The saturated solution acts also on plants and the lower animals as a violent poison, though containing but five per cent. of the acid. The solubility of the acid may be considerably increased by the addition of from five to ten per cent. of alcohol or of acetic acid.

From the experiments which the author has made on the action of phenic acid on plants and animals, it

appears that a very weak solution will instantly destroy the lowest forms of animal and vegetable life The juices of vegetables are prevented from becoming mouldy by the addition of the smallest quantity of the acid. Herbs and shrubs watered by a stronger solution rapidly die.

The microscopic beings concerned in the production of putrefactive fermentation are as quickly destroyed by a weak solution, and the putrefaction is completely arrested. Parasitic and earth-worms also are easily killed by a solution containing one half per cent., or by exposure to air containing but a small proportion of the acid. An injection of water containing one-half per cent. of the acid brought away from a child a large quantity of *ascarides lumbricoides*, all dead. A stronger solution kills the eggs of ants and earwigs, and larvæ of butterflies, caterpillars, &c.

The author has studied the action of the acid on the mammalia with mice, guinea-pigs, dogs and horses, as well as men.

Action on the Human Skin.—Immediately after the application of a thin coating of the pure acid, a sharp smarting is felt, which last about an hour. The epidermis becomes wrinkled, and in a short time the formation of a white body may be remarked wherever the acid has touched. This white coloration results from the action of the acid on albumen; it disappears by degress, and is replaced by some congestion, which lasts about twenty days. This congestion presents all the characters of an intense inflammation, being attended with redness, heat and swelling. If a small piece of the epidermis (which appears raised as in a blister) be stripped off, no serum escapes. The epidermis becomes detached by degrees, and when the exfoliation is complete a brown spot remains, which testifies for a long time to the energetic action of the acid. After a number of experiments on his own arms, and the arms of his friends, M. Lemaire assures us that the smarting never lasts longer than an hour. The redness of the skin endures about twenty days, but the inflamation never extends beyond the part to which the acid has been applied.

Action on the Mucous Membrane.—The action of the pure acid on the mucous membrane is, of course, analagous to its action on the skin; acute smarting, shrivelling up of the epithelium, and a milky coloration being observed. The smarting does not last so long as on the skin, especially on such membranes as produce an abundant secretion; and the epithelium quickly returns to its normal condition.

Action on the Respiratory Organs.—From experiments on mice and horses, the author concludes that the higher animals may breathe the diluted vapor of the acid for a long time without discomfort or danger.

Mode of Action.—The general fact resulting from the author's experiments is, that phenic acid acts on plants and lower animals as a violent poison.

When the action of the acid on a semi-transparent leaf is examined, it is easy to prove that it congulates albumen, and that the parenchyma and epiderm are contracted. This explains how it is that microphytes and microzoons die so quickly in its presence. All animals with a naked skin, and those which live in the water, die sooner than those which live in the air and have a solid envelope. The difference appears to result from the power of absorption, which is much greater in the former than in the latter.

When frogs are placed in a saturated solution (five per cent.) of the acid, the skin shrivels and becomes milky from the coagulation of the albumen. The branchiæ of fishes also becomes white. This coagulation of albumen led the author to suppose that the death of the animals resulted from the coagulation of their blood. To verify this supposition, he examined, under the microscope, the action of the acid on the branchiæ of the larvæ of salamanders, in which the circulation of the blood is easily seen. He then observed that, although the solution arrested the circulation instantaneously, it altered neither the form nor appearance of the blood globules. All the change consisted in their immobility. When the blood is congulated by mineral acids the form of the globules is changed. With carbolic acid nothing of the kind takes place. Besides this, a post-mortem examination of a dog and horse proved that the blood was not coagulated. Phenic acid, then, does not kill by producing coagulation of the blood! Its action on the blood globules, however, leads M. Lemaire to think that these globules are living beings.

Insects exposed to a weak dose of the acid become asphyxiated, but they soon recover in pure air.

When a gramme or two dissolved in water is administered to a dog, the animal falls as if struck with lightning, but soon recovers again. The sudden fall the author ascribes to violent pain, and the rapidity with which it is absorbed and carried to the nervous centres. It is on the nervous system, then, that phenic acid principally acts.—*Am. Druggists' Circular.*

NEW FILTERING APPARATUS FOR WATER.

An idea has been broached by M. V. Burq, a French engineer, for the construction of apparatus for the filtration of water in large volumes, such as required for the supply of cities, &c., which promises to be of importance in many situations.

He proposes to construct an iron flat-bottomed boat, where the object is to filter the water of a river or current stream of any sort. From end to end of this boat run a number of large parallel tubes, which may be of iron, but which he proposes to make of pottery. These are open at both ends to the water, and placed longitudinally in the boat like the tubes in a locomotive boiler. At the lower side of each tube apertures are arranged to be filled in, with separate plates of porous stone (like Ransome's patent artificial filtering stone) cemented into place, and which the inventor proposes shall be each about 10 decimeters square, and from 1½ to 2 centimeters thick. The boat being depressed below the level of the uppermost tube in the water, it is obvious that all the tubes become filled, and, by the pressure of the water within them, the filtered liquid passes through the porous plates into the cavity of the boat. Upon the top or deck of the boat is placed the pumping apparatus and steam-engine by which the water is to be elevated from the interior of the boat and distributed to its destination. The boat is moored, stem and stern, *in filo aquæ*, and thus, by the current continually passing *through* the tubes, the external surfaces of the filtering plates are constantly swept clean, without any special care. Each tube is, of course, provided with a slide-cock at each end, so that in the event of a plate becoming broken, that tube can be laid dry, and the plate replaced.

One such boat may have a total filtering surface of from 6,000 to 7,000 square meters of permeable plates, and as each square metre will yield from 5 to 6 cubic metres of pure water per 24 hours, the one filtering boat will produce from 30,000 to 35,000 cubic metres of pure water per day; and the inventor states it will produce this at a cost, all expenses included (except pumping, which, of course, depends upon the distance and mean elevation required), of half a centime the cubic metre. The inventor does not appear to have provided for the results of the boat becoming completely filled with water through any accident or neglect, or through the continued action of the filtering apparatus while no water was being pumped out; but it is obvious that the boat may be made a double-skinned vessel, at the sides at least, so as to be unsinkable in this way. We see no reason why the whole bottom of the boat might not be made available by analagous means for filtration, as well as the tubes. The current will clear the plates of one as well as of the other, and the latter plates have the advantage of presenting their external surfaces *inverted*, so that all sullage will fall naturally from them. The same method, with modifications, might be made available in stagnant waters, as well as in rivers, &c.

It might be a matter for consideration for some of our London water companies, who draw from the Thames, whether the water of the river, if thus filtered in large moored filtering barges upon the river surface, even in a rough way, before it is passed on to their sand filtering beds, might not in the end be rendered much more pure, or as pure as now, at a less expense, for, assuredly, the sand beds would need much less cleansing. The pumping engines, for clearing the water from the filtering boats, might be placed on land, and the suction pipes, laid under the river bed, might rise vertically under the filtering barge, passing up through the bottom in a properly constructed well in the boat.—*Practical Mechanics' Journal.*

Embezzlement by a Gas Collector.—At Leeds, England, Charles Musgrave was recently charged with having embezzled several sums of money belonging to the Leeds Gas Company. Musgrave was the collector for the company. In consequence of some suspicion, they had recently made a slight examination of his accounts, which had led to the discovery of a number of deficiencies, amounting altogether to about £400. The examination of the books is not yet complete, and it is said that the whole amount thus appropriated will reach a larger sum than that above stated.

Gas in Belgium.—The Belgium General Company for Lighting and Heating by Gas possess works at Prague (Bohemia), Sourain, Tournai, Charleroi, and Chemnitz (Saxony), and have recently obtained the privilege of lighting the towns of Rimini and Sienne. Negotiations are also pending for other towns. This company's affairs are in a prosperous condition.

Gas Explosion in England.—A violent explosion of gas occurred at the residence of Mr. Andrews, Hallgate, England, during last month, occasioned by Mr. Andrews neglecting to turn the gas off at the chandelier of his sitting-room on the second floor. It appears he had been using the gas in his room on a previous evening, and, on retiring, left one of the burners unturned, but turned off the gas at the meter, which was returned the following evening to obtain light for the shop and kitchen. In the meantime, Mr. Andrews forgot that the chandelier was not secured, and the gas was thus escaping from Sunday evening to Tuesday evening, when, having occasion to go into the sitting-room with a candle, the mixture of gas and air immediately exploded with a report which alarmed the neighborhood, tearing and shattering the panels and doors, and blowing out the windows. The most singular part of the thing is that Mr. Andrews was not injured in the slightest degree.

Alleged Petroleum Nuisance at Hull, England.—At the fortnightly meeting of the Hull Sanitary Committee, held on Wednesday, Mr. Alexander Mayfield, the chairman, read a letter which had been written by Alexander Witty, complainiug that a nuisance had been very noticeable during the past week, arising from Mr. Tall's petroleum distillery, in Holderness road. Some of the members of the committee stated that the nuisance was so great that the inhabitants of Holderness road could not open their windows. The Inspector of nuisances stated that he had made a report. The Chairman stated that Mr. Tall had been already warned, and it was for the committee to determine what course should be pursued. It was then resolved that Mr. Tall have immediate notice to abate the nuisance, and, in default, that proceedings should be taken before the stipendiary magistrates.—*Oil Trade Review.*

Gas-producing Material.—At the inauguration of the Pangbourne, England, village gas-works, Mr. G. Bower, of St. Neots, remarked that he had long come to the conclusion that there is nothing in this country that can compete with coal, be it liquid or solid, for gas-making on a large scale, for the elements required to make illuminating gas exist in most coals in the exact proportions required—sufficient hydrogen to heat the carbon, and sufficient carbon to give the light. Cannel coal yields the richest gas, but as the coke from most of it is of little value, and the gas richer than consumers care to pay for, it is only used for mixing with inferior coal. But a great deal depends upon the way in which the gas is burnt to obtain the greatest illuminating power. A poor gas requires less air than a rich one. What would be just enough for the former would be totally inadequate for the latter, for it would smoke, and then people would say, "What bad gas it is!" Now, whenever you see ceilings black, suggest a new burner adapted to the character of the gas being burned.

Richmond, Va.—A paroled prisoner, recently confined in the Libby prison and Castle Thunder, in Richmond, Va., says that these two buildings are lighted with gas, which is of so poor a quality that sperm candles would give a better light.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

LIGHT, HEAT, WATER-SUPPLY AND SEWERAGE.

Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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THE

AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, ... EDITOR.

MONDAY, FEBRUARY 15, 1864.

On Friday evening, January 15th, one month ago, the ship *Lotty Sleigh* lay in the river Mersey, near Liverpool, England, outward bound, and laden with a valuable miscellaneous cargo. Among other articles on board was a quantity of gunpowder, amounting to twelve tons. In the course of the evening the steward of the ship attempted to fill a kerosene-oil lamp, which was burning. In pouring in the oil it ignited, and ran over the floor of the cabin, setting the ship on fire. The consternation of the officers and crew may be better imagined than described. The ship being on fire with twelve tons of gunpowder in the hold, the only alternative presented to them was immediate escape. The fire burned on till it reached the gunpowder, when the ship appeared to be bodily lifted out of the water, and then was blown to atoms.

This explosion occurred within two-thirds of a mile of Liverpool, and the blazing ship lay only 200 yards from the nearest vessel. According to the *Sanitary Reporter*, the concussion caused by the explosion was felt for miles around. The gas-lights in the streets and houses of Liverpool were instantly extinguished, "owing," says our contemporary, "to the vibration of air being communicated to the gas within the pipes, so as to produce a return wave, which, for a sinlge moment, checked the supply of gas at the burner." Fortunately, no lives were lost by this terrific explosion.

Now, we think it very clear that, apart from the carelessness of the steward of the ship in attempting to fill a lamp while burning, the cause of the disaster was using badly refined and explosive oil. No kerosene oil which has been properly refined will ignite and burn as it runs along the floor. In order to do this, it must be surcharged with naphtha and other light hydrocarbons, which give off vapor enough at ordinary temperatures to cause them to ignite at the approach of fire. Oils which have been subjected to careful treatment should contain none of these volatile bodies, and consequently should be safe even in careless hands. In the case of the *Lotty Sleigh* we suppose no clue can be had to the quality of the oil in use, for everything on board the unfortunate vessel was destroyed, but investigations ought to be set on foot, and persistently followed up, to prevent this dangerous stuff being sold to unsuspecting consumers. The trade owe it to themselves to expose and publicly denounce the swindlers, for they are nothing else, who sell this explosive oil; and they should see to it, that all oils offered in the markets be subjected to a severe and searching test.

A year or two ago there was much excitement on this subject, and many examinations of oils were made for prominent houses in the trade, both here and elsewhere. This was after several fatal explosions had occurred, and the people had begun to really question the safety of all coal oils. Since then, an apathetic feeling has succeeded the excitement, and there is danger of other disasters unless the same care be taken to guard against them.

It was but a few weeks ago that the public were shocked by the announcement of the terrible calamity occurring at Santiago, Chili, by which over two thousand women and children were burned to death. This catastrophe originated from the explosion of a "paraffin" lamp, which sent the blazing oil all over the showy decorations of the church, with its festoons of inflammable things and its garlands of flowers. The horrors of this scene have been fully portrayed in the daily papers, and it is as foreign to our inclination as it is unnecessary to our purpose to reproduce them here. We merely instance this monstrous calamity to show how fearful may be the results of using improperly refined oils. Fire Marshal BAKER truly declared in one of his recent reports, that even burning-fluid was less dangerous than badly refined kerosene oil, for water will so mix with the former as to fully extinguish the flame, while the latter will sometimes burn while floating on the surface of water.

Of course, by these remarks we intend no disparagement to properly prepared hydrocarbon oils. When they are manufactured with care, as they are turned out by the most responsible firms, they are safe and pleasant illuminators, though, in our opinion, far inferior to gas. But it is evident that the two fearful calamities above referred to—the one resulting in a wholesale destruction of human life, and the other in the ruin of a large amount of valuable property, owe their origin wholly to the use of badly refined kerosene,—or, as they term it in England, "paraffin" oil.

GAS CONSUMERS' COMPLAINTS.

In another column we publish a letter on "the gas grievance," which we clip from the *Evening Post*. We reproduce the communication, merely to give an instance of the unreasonableness of the complaints usually made against gas companies, and to show the utter folly of the views generally held by consumers. "Gastric," who, from the *nom de plume* he has selected, we suspect belongs to the epicurean school of philosophers, uses rather a more gentlemanly way of submitting his grievances than most grumblers do. Instead of resorting to charges of "swindling," which the generality of these scribblers adopt, he takes a more humerous view of the subject, and after making several brave resolutions as to what he would do to punish the company, he finally lets fly a pigmy shaft at them through the columns of a daily contemporary, in the hope, no doubt, of provoking other indignant consumers into similar exercises of the pen.

Aside from the grotesqueness of the style adopted by "Gastric," there is enough in the absurdity of his views of the duty of a gas company to cause a smile. His unsophisticated notion that the company are bound to protect meters from freezing, is about on a par with the ideas of most consumers, who, if any mishap happens to the pipes or fittings, are sure to visit their anathemas upon the managers of the company supplying them. If the water-pipes in "Gastric's" premises were to freeze and burst, to whom would he send for relief? Not to the Croton Board, assuredly, but to the nearest plumber, who would soon shut off the supply, and afford the needed remedy, by thawing out the pipes, and repairing the fracture. If the water purveyors are not called upon to keep their fittings in order, why should it be expected of the gas company to perform a similar service? If consumers expect the company supplying them with gas to also keep a careful supervision of the meters and fixtures within their premises, they are straining a point, and bordering on the absurd. As well might they call upon the grocer or baker, or on any other tradesman who furnishes them with the supplies for the domestic larder, to remedy any defect in their respective articles occurring after their purchase.

The officers of gas companies ought to be gifted with the most equable temperaments, in order to successfully repel the attacks of excited consumers, who would overwhelm them with the most trivial complaints and absurd demands. The gentleman with the "whitish" hair, referred to in "Gastric's" letter, seems to be well adapted for the position he so ably fills, and the Manhattan Gas Company may congratulate themselves upon the clever manner in which he cools down the wrath of their enemies, and the degree of respect he compels them to feel for him.

A BAD BEGINNING.

A meeting of the promoters of the "Gas Consumers' Protective Union" was held a few evenings ago in Brooklyn, Judge Centre in the chair. The chairman announced that the Executive Committee had drawn up articles of incorporation, which were to be submitted to the Common Council. The principal features of these articles are, that all profits of the concern, after paying a fair interest on the capital, are to be divided among the consumers, and that every man owning $25 worth of the stock, and every person consuming $25 worth of gas a year, shall be entitled to a vote in the management of the company.

It will be remembered that the principal burden of the speeches made at the indignation meeting recently held in Brooklyn, by these very "Protective Union" people, was, that the consumers had been wronged by the removal of the competition formerly existing between the Brooklyn and the Citizens' gas companies. The threadbare banner of "monopoly" was again unfurled, to excite the people to deeds of valorous onslaught against the companies, and the benefits of competition were freely dwelt on. Since the indignation meeting was held, another corporation—the Long Island Gas-Light Company—have obtained from the Brooklyn City Councils the privilege of putting their mains through the streets, and we find the "Protective Union" advocates steadily opposing this new company, and petitioning the Mayor to veto the resolution passed by the Common Council. This is a bad beginning for the promoters of the nondescript "union." One week preaching up the advantages of healthy competition, and the next doing all in their power to prevent a competing company from obtaining permission to distribute gas. Such shallow pretensions to sincerity serve to show the real design of the "Protective" schemers, and consumers would do well to shun all such chimerical plans as they propose.

ANSWERS TO CORRESPONDENTS.

J. R. G., of Pa.—*Your "discovery" may be new to you, but not to the medical profession. The anesthetic properties of the vapor of benzole have long been known.*

A. P. P., of N. H.—*Your reply to our first letter was never received. Your second letter, with enclosure, arrived in due time. Your request will be attended to at the first opportunity.*

L. E. F., of Md.—*The size of the burner may have very little to do with it. Ascertain the pressure, and then the calculation will be very simple.*

R. H. V., of Ky.—*We have no more copies of the work on hand. They may be imported through any responsible house. We would suggest Wiley.*

B. C. T., of Mass.—*The cost of the patent joint, or rather the pipe cast with this joint, is actually less than that of the pipe cast in the old way. We have been assured that there is a saving of $15 per ton. Write to the patentees, and they will give you full information*

THE PHILADELPHIA WORKS OF THE AMERICAN METER COMPANY.

Since our last issue we have had the pleasure, during a visit to Philadelphia, of calling on the American Meter Company at their new location, Arch and Twenty-second streets, and through the politeness of Messrs. Cartwright and Hopper, were shown over the entire premises, the ground plan of which embraces a lot 100 feet on Arch street, with a depth of 100 feet on Twenty-second street on the east, and Filson street on the west, thus having three street fronts. The building is four stories high, including the basement, with height of ceilings eleven and twelve feet, and a width of thirty feet. The floors rest upon heavy girders, supported by neat cast-iron columns through the centre from the foundation upwards, and are so arranged that the base of each story of columns rests upon the iron cap of those below; and instead of the joists being set edgewise they are laid flat, and the flooring laid crossing as usual on the top, by which plan a uniform ceiling, and, in our judgment, a stiffer floor is obtained.

The eastern wing is devoted to the *power work*, which is driven by a neat and very compact upright engine of fifteen horse power, which occupies a space of five feet square in the north end of the basement. In the same room are stationed the heavy drop and punching presses, with such machinery as is required in connection therewith. On the first floor the machinery and tools for making the various moulds, punches, dies, &c., are placed, embracing engine-lathes, planers, shaping machines, and vices. The second floor is termed the brass shop, where all the turning and finishing of the various parts is done, including the index or registering movements. The work of this kind is of a very delicate nature, and it is very interesting to watch the progress of the operation from the plain brass castings to the finely-cut gearing and the complete index. The third floor is subdivided into smaller rooms appropriated to the leather work, in its various stages of manufacture, for the diaphragms of dry meters, which appear to be fast replacing wet meters in all cities where the cold weather is severe enough to annoy consumers by freezing.

The western wing of the factory is devoted to the tin work, and is subdivided into the wet and dry meter departments, and including also the *proving-room*, an apartment that is really the most important of the whole, as upon its arrangement and facilities so much depends for the correctness of the meters. It may prove of service to the patrons of this company to know that in this department every thing that forms an element to insure perfect accuracy in the testing of meters is provided, without regard to expense, and here we find a beautiful and scientific gauge, or standard cubic foot measure, obtained from the United States Assay Office, and guaranteed to be correct. By this gauge all the meter provers are graduated, and thus the same scale of correctness is transferred.

From the proving room we step into the painting room, arranged with commodious shelving and benches in the neatest manner; and from here into the ware-rooms, where we were astonished to see what a number of meters could be shelved in a given amount of space; but owing to the popularity of the meters of this company, and the great demand for them, it is impossible to keep enough of them in stock to completely fill the shelves. Adjoining the wareroom is the packing room, from whence the meters are shipped to all parts of the United States, West Indies, and South America.

The whole building is heated by steam, lighted by gas, and furnished with water throughout.

Of the arrangement of the business offices, counting-room, show-room and store-room, we would simply say that they are all on the same scale of convenience and system that characterizes the whole establishment, which, taken together, comprises one of the neatest and best adapted manufacturing buildings in the country, and reflects much credit upon the heads that have planned and executed it, and will amply repay the time required for an inspection of the premises. The external appearance of the building, whilst making no particular architectural display, is of a permanent and pleasing style, that harmonizes with its use.

We cannot conclude this notice without adding our testimony to the high character that the Philadelphia meters have always enjoyed, and trust, with these new facilities, the American Meter Company may continue to receive that share of appreciation which the correctness of their apparatus merits, and which was so liberally awarded to the individual firms from whose union the company arose.

REPORTS OF GAS-LIGHT COMPANIES.

DUBUQUE, IOWA.

Annual Statement of the Key City Gas-Light Company, Dubuque, Iowa, December 31, 1863.

ASSETS.

Capital Stock	$50,000 00
Gas-bills collected	12,941 59
Tar, coke, and mdse	675 50
Profit and loss	701 86
Dividends unpaid	29 25
Total	64,348 20

LIABILITIES.

Gas-works	50,000 00
Wages	3,660 35
Coal	4,909 32
Expense	1,036 65
Lime	595 50
Repairs	463 70
Surplus	3,682 68
Total	64,348 20

OFFICERS AND DIRECTORS FOR 1864.

C. H. Booth, Pres. J. K. Graves, Sec. & Treas.

C. H. Booth, W. G. Stewart,
J. K. Graves, T. C. Roberts,
Wm. Carter, C. H. McArthur,
J. A. Robinson.

STOCKHOLDERS.

J. K. Graves	39,900
Wm. Carter	4,325
C. H. Booth	500
S. C. Higginson	1,125
T. C. Roberts	1,000
F. M Drexel	825
Brunskill & Waters	250
R. C. Clingman	200
T. Rogers	450
J. A. Robinson	250
C. H. McArthur	250
Jas. Pratt	250
J. O'Niel	175
W. G. Stewart	250
D. M. Stewart	250
Total	50,000

Drying Coal by Centrifugal Force.—A patent has been granted to Mr. Prosper Hanrez, Engineer, Belgium, for improved machinery for drying coal. It consists of a central shaft, mounted in a socket, in such a manner as to allow of a sufficiently rapid motion being imparted to it to throw off, by the effect of centrifugal force, the water contained in the coal. On this shaft is fixed a circular ring or crown, to which is attached a frame covered with wire-cloth or perforated sheet metal, the holes being of such a diameter that the water will escape while the coal will be retained. A hollow shaft, concentric with the first, turns rapidly in the same direction, but with a different velocity, serving as the axis to a spiral screw, of which the exterior diameter is equal to that of the interior of the perforated cylinder. By the action of this screw the coal, which is being continually fed to the apparatus by a hopper, will fall on to the top thread of the screw, which is slightly curved upwards or flanged, in order to collect or throw over the matters more quickly. By the rapid rotation of the screw the coal is thrown against the sides of the drum, down which it falls, deprived of its moisture, into the reservoir arranged to receive it. The rotation of the drum and of the screw can be so adjusted as to insure the coal being retained in the apparatus until it is perfectly dry.

Gas in Cuba.—Gas-works are about to be built in the town of Santa Espinta, where there is a population large enough to justify the enterprise. Most of the gas-works in the Island of Cuba are doing well.

WATER-WORKS OF AMERICA.

PHILADELPHIA, PA.

We have received the last Annual Report of Isaac S. Cassin, Esq., Chief Engineer of the Philadelphia Water-Works, from which we abstract the following particulars:

Fairmount Works.

During the past year, the main reliance at Fairmount has been upon the new portion of the Works, and it has been demonstrated that the new Turbine wheels and pumps have been equal to any demand that has been made upon them. They have been in constant operation more than a year, and have proved satisfactory.

It is stated that, by the further introduction of Turbine wheels, the capacity of the Fairmount Works would be greatly increased, and even in seasons of drought they would be able to afford a considerably increased supply. Many of the old pumps are pronounced unfit for use, and it is urged that they be replaced by others of improved and more efficient construction. The wooden wheels are now regarded as of a character quite obsolete, and fallen entirely out of use in the construction of works of this description, and their performance, with such immense waste of water, is incompatible with the economy of modern machinery. The annual waste of water by the continued use of these wooden wheels would, if rendered available, be a most important contribution to the supply, and would soon repay the erection of the most effective pumping machinery. The experience with Turbine wheels has conclusively shown their superiority over all other applications of power for this purpose, and it is strongly urged that further improvements be made in the Fairmount Works by additions of machinery of that description, at the earliest practicable period.

The dam at the Fairmount Works demands immediate attention, as nearly the whole of the supply of water to the city depends upon it; and its destruction or injury would be a disaster of the most serious nature. It is now rapidly filling up, and its usefulness is much impaired. At no distant day it will be necessary to resort to expensive methods for the purpose of removing the accumulations of sediment, and to restore it to an efficient condition.

If measures are not entered upon, having in view the introduction of new machinery, a considerable amount will be required for repairs at these works during the coming year. The buildings are in good condition with the exception of the roofs, and will require only the usual expenditure for repairs.

The following is a statement of the operations of the Fairmount Works during the year 1863:

OPERATIONS OF THE FAIRMOUNT WORKS DURING THE YEAR.

1863.	Number of gallons pumped each month.	Average number of galls. raised per day.
January	295,206,564	9,522,792
February	249,818,525	8,921,911
March	328,142,762	10,585,250
April	365,895,151	12,196,505
May	470,595,641	15,180,504
June	490,075,620	16,335,854
July	537,148,468	17,972,531
August	676,208,391	21,818,173
September	581,611,810	19,487,043
October	569,574,845	18,373,382
November	514,421,446	17,147,381
December	485,013,365	15,645,753
Total	5,586,712,091	15,306,060

RUNNING EXPENSES OF FAIRMOUNT WORKS DURING THE YEAR.

Salaries of Engineers and Assistants	$3,100 00
350 gallons of oil, at $1 10	385 00
650 lbs. tallow, at 14 cents	91 00
100 tons coal, at an average price of $5 $78\frac{48}{160}$ per ton.	573 48
Packing and small stores	475 00
Gas for lighting	458 62
Repairs	3,996 08
Total	$9,079 18
Cost of raising water into reservoir, per million galls.	$1 62⅓

The Spring Garden Works.

These works are in good repair, with the exception of some of the engines and pumps of the earlier erection and construction, which are so much worn that it has become expensive to keep them in proper repair

and condition. It is again suggested that the introduction of engines at these works more effectually and more economically adapted to pumping purposes be early considered. If the same amount now invested could be expended in the most approved pumping engines, there could be raised into the reservoir at least double the amount of water without increasing the running expenses of the works, and as there is a pressing necessity for additional power at these works for the purpose of meeting the demand at all seasons, the question of enlarging the pumping facilities is of great and urgent importance. There are periods during every year when there is not water in the Schuylkill river for motive power sufficient for pumping all the water that is required in the district now supplied by the Fairmount Works, and to meet such emergencies additional steam-power should be provided, and its erection at the Spring Garden Works would be the proper location.

In the event of abolishing the Kensington Water-works, the increase of the steam-power at the Spring Garden Works will be indispensable, because in seasons of a scarcity of water for motive purposes the Fairmount Works could not possibly meet any additional demand. There is at the Spring Garden Works ample room for the erection and accommodation of engines of greatly increased power and more economical construction and operation than those which are already in operation.

The additional machinery should be of sufficient capacity to meet any possible disability at the Fairmount Works, and should be so constructed in its ingress and egress mains as to be capable of fully maintaining the supply independently of the entire works at Fairmount, the dam included. This subject should receive that thorough and careful examination and consideration which its importance deserves. On reference to the tabular statement of the operations of these works, it will be observed that the quantity of water pumped has decreased. This circumstance is owing to the fact that the greatest practicable quantity with the increased facilities has been pumped at the Fairmount Works, and the power at the Spring Garden Works has been reserved as far as possible. By this means there has been a considerable saving in the items of coal and other materials, and the district fully supplied much more economically than ever before. It may also be observed that the duty of engines is greater than ever before accomplished.

The buildings at these works are in good order, except the roofs, a portion of which have been renewed during the past year, and the painting, in both of which it is proposed to make repairs the ensuing year. The machinery also requires re-painting. The following is a statement of the operations at the Spring Garden Works in the year 1863:

OPERATIONS OF THE SPRING GARDEN WORKS DURING THE YEAR.

MONTH. 1863.	Number of gallons of water pumped each month.	Average number of gallons per day.	Pounds of coal consumed.	Average number of pounds per day	Gals. rais'd into reservoir p. lb. coal.	Gallons raised 1 ft. high per pound of coal.
January	148,125,720	4,778,249	369,936	11,933	400.4	46.046
February	125,019,960	4,464,998	342,048	12 216	365.5	42,682
March	198,966,360	6,418,269	547,568	17,663	363.3	41,786
April	194,828,760	6,494,292	538.160	17,938	362.2	41,682
May	296,011,680	9 548,763	870,912	28,098	339.8	39,076
June	229,604,400	7,653,480	579,600	19 320	396.1	45.556
July	199,606,800	6,438,929	529,872	17,092	376.7	43,320
August	165,685,200	5,344 683	387,968	12 515	427.5	49,110
September	184,796,400	6,159,880	520,688	17,356	354.9	40.813
October	159,710,400	5,151,948	368,704	11,8 3	433.1	49,813
November	172,244,400	5,741,480	404,208	13,473	426.1	49,003
December	129,169,200	4,166,748	319,312	10,300	404.5	46,519
Total	2,203,769,280	6,037,724	5,778,976	15,832	381.3	43.854

Average duty for the year, 36,545,000 pounds raised one foot high with 100 pounds of coal.

Average amount of coal consumed per day, 15,832 pounds, or 7 tons, 0 cwts., 5 qrs., 12 lbs.

Total amount of coal consumed by engines, 5,778,976 lbs., or 2,579 tons, 18 cwts.

RUNNING EXPENSES OF THE SPRING GARDEN WORKS DURING THE YEAR.

Salaries of Engineers and Firemen	$7,200 00
171 gallons oil, at $1 10	188 10
1,145 lbs. tallow, at 14 cents	160 30
2,579 tons 18 cwt. coal, at an average price of $5 22 per ton	13,467 07
Packing and small stores	510 60
Gas for lighting works	279 45
Repairs	3,957 98
Total	$25,762 90
Cost of raising water into reservoir, per million gals.	$11 69

The Kensington Works.

The water-works located on the Delaware river, and known by the above title, have, during the past two years, been worked to their utmost capacity, and, as at present constituted, cannot be further taxed without actual injury and great risk. The necessity and expediency of making other provision for the supply of the district now dependent on them has been fully discussed, and is generally admitted. Its earliest possible consummation can scarcely prevent the recurrence of the inconvenience and suffering experienced by the citizens of that district in late years. As these works are at present arranged, with a single pumping main, the present capacity of the pumps is but one-half made available. During the seasons of greatest demand one engine is not sufficient to furnish a necessary supply, and it is only by excessively working the engines that an average head of water can be maintained in the reservoirs.

The suggestions and the plans heretofore presented for the supply of this district and the abolishment of the Kensington Works have received most careful examination and consideration by the Committee on Water-Works of the past year, and the features of the ordinance embracing the views matured by that Committee are undoubtedly so familiar as to require no reiteration here. During the year 1863, there has been no water from the Schuylkill river supplied to this district, and though there have been frequent complaints of the quality, as well as of the deficient quantity of the water supplied from the Delaware, the department has not the necessary arrangement of mains and other facilities for guaranteeing a sufficient supply at the season that it is most needed and necessary.

The operations at the Kensington Water-Works for the year 1863 are as follows:

OPERATIONS OF THE KENSINGTON WATER WORKS DURING THE YEAR.

MONTH. 1863.	Number of gallons of water pumped each month.	Average number of gallons pumped per day.	Pounds of coal consumed during the month.	Average number of pounds of coal used per day.	No. of gals. raised into reservoir per pound of coal.	Duty in gals. raised one foot high per pound of coal.
Jan	82,972,920	2,676,545	350 922	11,320	236.4	26,481
Feb	85 589.050	3,056,751	375,579	13,413	227.8	25,522
Mar	99 558,970	3,211,579	411,810	13,284	241.7	27,076
April	74,819,680	2,493,989	311,124	10,370	240.4	26,933
May	106,926,770	3,449,250	420,045	13,549	254.5	28,510
June	102,919,530	3,430 651	411,090	13 703	250.3	28,039
July	109,796,200	3,541,812	426,418	13,755	257.4	28,837
Aug	104,102,560	3,358,147	447,095	14.422	232.8	26,078
Sept	109,720,040	3,657,334	484,440	16,148	226.4	25,365
Oct	109,589,650	3,535,150	484,381	15,680	226.1	25,331
Nov	96,517,390	3,217,244	465.887	15,529	207.1	23,201
Dec	100,026,980	3,226.676	482,894	15,577	207.1	23,199
Total	1,182,539,680	3,239,834	5,071,835	13,895	233.1	26,112

Average duty for the year, 21,760,000 pounds raised one foot high with 100 pounds of coal.

Average amount of coal consumed per day, 13,895 lbs. or 6 tons, 4 cwt., 0 qrs., 7 lbs.

Total amount of coal consumed by engines 5,071,835 lbs., or 2,264 tons, 4 cwts., 0 qrs., 27 lbs.

RUNNING EXPENSES OF KENSINGTON WORKS DURING THE YEAR.

Salaries of Engineers and Firemen	$4,400 00
75 gallons of oil, at $1 10	82 50
641 lbs. of tallow, at 14 cents	89 74
2,264 tons, 4 cwt., 0 qr. 27 lbs., at an average price of $5 56 per ton	12,589 01
Coal oil for lighting works	71 92
Packing and small stores	132 50
Repairs	1,496 30
Total	$18,861 97
Cost of raising water into reservoir per million galls.	$15 95

The Twenty-Fourth Ward Works.

During the year just closed the department has experienced great difficulty in furnishing a supply of water to the district attached to these works with but partial success. These works were originally constructed to furnish a supply of about nine hundred thousand gallons per day, and up to that point no considerable difficulties have been experienced, as the machinery has been found to work with perfect safety at the full measure of its rated capacity, but during the past year the demand for consumption in the district frequently exceeded sixteen hundred thousand gallons per day. This greatly increased demand, and the great importance of meeting it, involved the necessity of partially reconstructing and increasing the strength of some of the most important working parts of the machinery, which has been done at intervals; but in consequence of there being only a single ascending or pumping main from the works to the stand-pipe, and not sufficient storage capacity to meet even ordinary requirements of the demand, the works had to be stopped on several occasions, and the supply was, of course, totally suspended. The district supplied by these works is rapidly becoming one of the most extended, wealthy, and profitable of the city, and it is the only one in which the present provision for such purpose does not render it possible to furnish a necessary supply.

There can be no valid reason why suitable provision to meet both present and future wants and probable contingencies should not be made to such extent as would be commensurate with private improvements and the liberal policy evinced by the property owners of this ward. The consideration of the improvement and better adaptation of these works has received, during the past year, the careful attention of the Committee on Water-Works, and, at the instance of that committee, an amount was asked for, which, though not sufficient for all necessary purposes, would have done much towards the consummation of the improvements to which allusion is here made.

There can be no dependence, for constant supply, upon these works, without the addition of a reservoir, to be constructed at the earliest practicable period, and of such capacity as to warrant a supply always for at least sixty days. The earliest action can scarcely prevent a failure in the supply, which must be of the greatest inconvenience to the citizens of the district dependent on these works. An additional pumping main from the works to the stand-pipe should be laid with the least possible delay, so that both engines could be kept in operation at the same time, and by such means the demand of the approaching summer may be nearly adequately furnished with the average supply, without which no such supply can be guaranteed. The pumping facilities for this district must be considerably increased at no distant day, but their location should be determined by the shortest practicable distance from, and most convenient access to, the proposed reservoir. The operations of the Twenty-fourth Ward Works for the year 1863 are as follows:

OPERATIONS OF THE TWENTY-FOURTH WARD WORKS DURING THE YEAR.

MONTH. 1863.	Number of gallons pumped each month.	Average number of gallons raised per day.	Number of pounds of coal consumed each month.	Average number of pounds consumed per day.	No. of gals. raised into stand-pipe per pound of coal.	No. of gals. raised one foot high per pound of coal.
Jan	37,156,140	1,198,585	195,100	6,293	190.4	43,801
Feb	34,072.740	1,216,883	190,700	6,810	178.6	41,094
Mar	40 302.720	1,300,087	219,700	7,087	183.4	42,191
April	42,277,500	1,409.250	218,500	7,116	193.2	45.544
May	47,564,190	1,534,328	239,700	7,732	198.4	45,638
June	38,122.290	1,270,743	171,600	5,720	222.1	51,094
July	46 187,330	1,4 8,300	203 500	6,564	226.7	52,143
Aug	45,021,510	1,452,306	205,800	6,638	218.7	50,314
Sept	49,988,070	1,666,269	228,000	7,600	219.2	50,425
Oct	46,948,860	1,514,479	220,900	7,125	212.5	48,881
Nov	50,181 660	1,672,722	249,300	8,310	201.2	46,296
Dec	47,981,080	1 547,776	197,000	6,354	243.5	56,016
Total	525,754,090	1,440,422	2,534,800	6,944	207.4	47,704

Average duty for the year, 39,753,33 pounds raised one foot high with 100 pounds of coal.

Average amount of coal consumed per day, 6,944 pounds, or 3 tons, 2 cwts.

Total amount of coal consumed by engines, 2,534,800 lbs., or 1,131 tons, 12 cwts., 0 qrs., 16 lbs.

RUNNING EXPENSES OF TWENTY-FOURTH WARD WORKS DURING THE YEAR.

Salaries of Engineers and Firemen	$2,950 00
9¼ gallons oil at $1 10	10 78
186 lbs. tallow at 14 cents	26 04
1,131 tons, 12 cwt., 0 qr., 16 lbs. at an average price of $5 82 per ton	6,585 95
Packing and small stores	78 00
Coal oil for lighting	127 89
Repairs	2,699 99
Total	$12,478 60
Cost of raising water into stand-pipe, per million galls.	$28 78

TABLE SHOWING THE MAXIMUM CAPACITY OF THE WORKS, AND THE CONSUMPTION PER DAY DURING THE MONTH OF AUGUST, 1863.

	Gallons.	Gallons.	Gallons.
The maximum daily capacity of Fairmount Works is....	30,000,000		
The average daily consumption in August, 1863, was..	21,813,173		
Leaving a daily excess of capacity of.....	.....	8,186,827	
The increase of daily consumption in August, 1863, over August, 1862, was...	.....	....	9,982,108
The maximum daily capacity of Spring Garden Works is	12,756,800		
The average daily consumption in August, 1863, was..	5,344,683		
Leaving a daily excess of capacity of.....	.....	7,412,117	
The decrease of daily consumption in August, 1863, under August, 1862, was...	.....	....	4,928,826
The maximum daily capacity of Kensington Works is rated at.....	3,000,000		
The average daily consumption in August, 1863, was..	3,358,147		
Leaving a daily excess of demand of.....	.....	358,147	
The decrease of daily consumption in August, 1863, under August, 1862, was...	.....	.. ..	93,154
The maximum daily capacity of 24th Ward Works, is rated at.....	1,152,076		
The average daily consumption in August, 1863, was..	1,452,306		
Leaving a daily excess of demand of.....	.....	300,230	
The increase of daily consumption in August 1863, over August, 1862, was ...	.....	....	37,787
Total daily excess of capacity over consumption in August, 1863, was.....	.....	14,940,567	
Total increase of daily consumption in August, 1863, over August, 1862, was....	.....	.....	4,997,915

The Fairmount Works are rated exclusive of capacity of mains. The other Works are rated in proportion to the capacity of pumping mains.

NUMBER OF GALLONS PUMPED BY ALL THE WORKS DURING THE YEAR.

MONTHS.	Number of galls. pumped each month.	Average number of galls. pumped each day.
January.....	563,461,344	18,176,172
February.....	494,495,272	17,660,545
March.....	666,970,812	21,515,187
April.....	677,821,094	22,594,036
May	921,098,281	29,712,847
June	860,721,840	28,690,728
July..	912,688,798	29,441,574
August	991,017,661	31,968,311
September	929,115,820	30,970,527
October.....	885,828,755	28,574,959
November	833,864,836	27,778,827
December.....	762,195,625	24,586,953
Total.....	9,498,775,141	26,024,041

Reservoirs.

At Fairmount the reservoirs require considerable repairs, although they have been constantly in use during the past year. The lining of one of them is in such a bad condition as to require almost entire renewal, and unless the dividing embankments are removed and this one compartment united to the largest reservoir, its repair will be necessary. The other compartments of these reservoirs are in much better condition. The Corinthian Avenue Reservoir is now in excellent condition; some difficulty has been experienced in preventing sliding in some parts of the embankments, but during the past year the slopes in the parts alluded to have been reconstructed and changed to such angles as will very probably insure them from the recurrence of this description of injury.

The Spring Garden Reservoir has been frequently represented as not adequate to the proper supply of the district dependent upon it, and with truth. Its capacity is nine millions eight hundred thousand gallons, or something less than one and a half day's supply, and the propriety of constructing a reservoir in this locality capable of containing at least sixty days' supply, to be of increased elevation, and connected with both the Spring Garden and Fairmount Works, invites serious consideration. This reservoir is in good condition, and is constantly in use at its full capacity. The future must clearly demonstrate the totally insufficient capacity and elevation of the present reservoirs of the water-works, and even a small additional elevation, quite practicable to be made, would prove sufficient to fully supply a greatly increased extent of territory without the necessity of erecting works in any new locality. There is pressing necessity for additional storage, which should be so arranged and sufficient to insure an uninterrupted supply in case of derangement in the pumping facilities at the works, and also that the pumping operations might be carried on with the greatest possible economy.

The reservoir at the Kensington Water-Works is now in good condition. For the purpose of supplying the rapidly improving district with which these works are connected, and especially some localities now being built upon, this reservoir should be raised to the elevation suggested in the last report. Several of the higher localities in this large district are so scantily supplied that the citizens suffer much annoyance and inconvenience. This unfortunate circumstance is owing to the fact that there is only one supply main of eighteen inches diameter from the reservoir for the supply of the entire district, which is obviously insufficient, and, in fact, is not more than necessary for the proper supply of one-third of the district. By converting the present pumping main into a distributing or supply main, as has been heretofore suggested, with connections of the principal or all of the distributing or service mains intersecting it, and with the additional elevation to the reservoir heretofore suggested, the district would be insured a full supply, and many points now deficient would be amply provided.

The Twenty-fourth Ward Works having no provision for storage, that district is especially liable to partial or even entire suspension of the supply of water in the event of derangement of the pumping machinery, or of accident to the pumping main. In the district supplied by these works the demand rapidly and constantly increases, and any necessary investment, in improving and extending the facilities for insuring a reliable supply, would not only add in a most important degree to the comfort and convenience of a large population, but would prove highly remunerative to the department. The permanent character of the improvements, and the rapidly increasing population of the Twenty-fourth Ward, fully warrant such arrangements and expenditure as would insure an undoubted supply beyond any usual or probable emergency. In the Twenty-fourth Ward, very considerable portions are of such an elevation that they can only be supplied by water-works separate and distinct from any at present erected east of the Schuylkill river. The lower or southern and southwestern portions might, however, be supplied much more economically from the works at Fairmount and Spring Garden, by taking a supply main across the Schuylkill river for that purpose, at some point below Fairmount. Measures cannot be entered upon too early for the purpose of preventing a very deficient or perhaps a nearly total failure in the supply to this district during the ensuing summer. Attention is called to the urgent necessity for the construction of a reservoir, the laying of sufficient pumping and distributing mains, and some other improvements in the works.

Distribution.

The arrangements for the proper or necessary supply of water in all the higher localities in this city must be admitted to be of entirely inefficient description. One immediate and remediable cause of this inefficiency is the fact that the supply mains are not of sufficient capacity, or, in other words, they are of such areas as do not in any suitable manner correspond to the elevations or *head* of the reservoirs from which the water is to be derived.

There are points at which even an approach to a supply for the purposes of strict necessity is with difficulty attained. This is particularly the case in the higher parts of the Fifteenth, Twentieth, and Twenty-first Wards, and also at some points in the Nineteenth Ward, and the late borough of Frankford, and also especially at localities in the Twenty-fourth Ward, alluded to in a preceding page. In a great measure this deficiency of supply is owing to the contracted dimensions or areas of the mains, which were constructed in many cases without the possibility of their ever being required to supply such largely increased populations having been entertained.

The insufficient elevation of reservoirs, and also the insufficient provision for storage, are also causes of the inadequate supply. In very nearly all districts in this city in which there is not a sufficient supply of water, the causes of such insufficiency admits of remedy consistent with the present construction and general organization of the water-works.

Water-Meters Advocated.

Claims and controversies, leading to much difficulty in their adjustment, constantly arise with the citizens whose water-rents include privileges for manufacturing purposes, and of those that may be termed of a temporary or somewhat indefinite character as to quantity required; there might be a useful and satisfactory application of meters for the purpose of determining the quantities consumed. Cases of the description here alluded to are constantly before the Committee on Water-Works, and this application of meters would undoubtedly save a considerable amount, as well as dispense with much difficulty in investigation and adjustment.

During the last year there were 59,961 feet, or 10 78-100 miles of water-pipes laid in Philadelphia, at a total expense of $70,489 59.

Much misapprehension seems to exist in relation to the cost of this description of improvement. Generally, it is to be observed, that the item of labor is regarded as the most important, which is by no means correct. An account of the expense of laying water-pipes in this city since its consolidation will afford correct views on this subject. The following statement of all water-pipe laid in the years enumerated is made, with the cost per foot, which includes all expenses properly chargeable:

Year.	Feet of pipe laid.	Cost per foot.
1855.....	31,574.....	$1 28
1856.....	54,879.....	1 27½
1857..... ..	61,182.....	1 28½
1858.....	67,519.....	1 19½
1859.....	97,993.....	1 18
1860.....	97,095.....	1 02
1861.....	59,405.....	1 09½
1862.....	48,475.....	1 16½
1863.....	56,961.....	1 23½

The principal item of expense in laying water-pipe is the cost of the pipe. The size almost invariably used is six inches in diameter, and may be taken to show the relative cost in the years above given.

For the years above given, prior to 1863, the average price of six-inch pipe was 52½ cents per foot; in 1863 the price paid was 79 cents per foot.

The average price of lead for the same years was 6 3-10 cents per pound; in 1863 the price was 12½ cents per pound. The quantity annually used has amounted to about 65,000 pounds. In the item of labor, the prices have increased thirty per cent. during the last two years.

Future Means of Supply.

This important subject has been frequently and fully discussed. Any expenditure made in the proper extension of the water-works has, without exception, been found very remunerative to the city, and has invariably paid much above the interest on the investment. As already stated, an increase in the pumping machinery at the Spring Garden Works is much needed during the summer months, and a very considerable increase in the capacity of reservoirs is indispensable for the full supply at present, and in a measure to anticipate the demand in the immediate future throughout the city. There should be an increase of storage capacity amounting to, at least, two thousand milions of gallons, arranged and distributed in such manner as to insure to all parts of the city the same supply, and for the same length of time. So far as relates to the resources of this city for the supply of water, they are so ample and apparent that there is not the smallest cause for doubt or apprehension. The rivers Delaware and Schuylkill will furnish the most ample supply for any length of time, however indefinite; and on their banks, and at no impracticable distances, locations may be found for the erection of reservoirs of any necessary elevations, and for the construction, under suitable circumstances, of pumping machinery of any desired capacity. By the observance of a proper system of sewerage of the city, either of these rivers will afford a full supply of water of superior quality.

This is the case on the Schuylkill at any point between Fairmount and the northwestern limit of the city, and on the Delaware at a point above Tacony. The river Schuylkill will certainly furnish a supply of water to the city of Philadelphia for a period reaching

so far into the future, that it is not now in any degree important nor necessary to anticipate resorting to any other source. For the purpose of obtaining from this river a supply which will soon be required, it will be indispensable to resort to steam-power to a much greater extent than is now provided. There is at all times in the Schuylkill an abundant supply, readily to be obtained by steam pumping, but which is not adequate to always furnish sufficient water-power for motive purposes as well as at the same time supply the demand for consumption in the city. Even at present the water-power at Fairmount, available for motive purposes, is fully brought into requisition, and is not sufficient during that important period of the year when a copious supply is most desirable. As this city extends northward on the Delaware river, it may become expedient to make it a source of supply, which is quite practicable. It will be necessary, in reference to such purpose, that the entire sewerage of the city be so arranged as to discharge their contents at points quite beyond the reach of the pumps, and, indeed, at such distance from them that the action of the tides could not possibly cause their contents to be brought into proximity with any works that might be established.

OFFICERS OF THE PHILADELPHIA WATER-WORKS.

Chief Engineer,
ISAAC S. CASSIN.

Register, CHARLES L. WOLFF.
Chief Clerk, WILLIAM F. BRADY.

Permit Clerks,
ROBERT A. P. MOORE, JOHN D. SCHOCH,
THOMAS W. SUTTON, WILLIAM F. A. LEVY,
JOHN L. HAMELIN.

Messenger,
LAWRENCE TOBIN.

Inspectors,
MAURICE A. HARRINGTON, EDWARD F. MCGEOY,
GEORGE W. KELLER, MATTHEW C. BRADY.

Purveyors,

Districts.
1st. JAMES L. MARSHALL, Office, 615 Carpenter street.
2d. THOMAS SHREINER, " 918 Cherry street.
3d. JOHN A. MEYERS, " 1420 Frankford road.
4th. WILLIAM H. EVANS, " 1324 Buttonwood st.

Engineer's Clerk, CHARLES PETERS.
Draughtsman, HENRY J. TAYLOR.

Engineers at Works.

Fairmount Works..... { ANTHONY MCGRANN, WILLIAM TODD.
Spring Garden Works..... { JONATHAN C. FINCHER, WILLIAM OTLEY.
Kensington Works..... { ROBERT J. HICKMAN, TOBIAS SIBEL.
24th Ward Works..... { LEWIS W. SHARPLESS, ROBERT J. DOWNING.

WOODEN TRAYS FOR GAS PURIFIERS.—Among the most valuable improvements in gas apparatus introduced within the past few years, wooden trays for gas purifiers are prominent. It is surprising that they have not entirely superseded the use of iron, for they have the advantage over them in every respect. Their first cost is but about *one-fifth* that of iron, while they will out-last them a long time. Those trays, made by Mr. Cheesman, of this city, are superior to all others. They are cut by improved patented machinery, which secures a bar of excellent shape, the ends of which expand so as to combine the greatest possible strength. These trays are used by nearly all our large gas-works.

DESTRUCTIVE FIRE.—We regret to learn that the dwelling of Oliver G. Steele, secretary of the Buffalo, N. Y., Gas Company, was recently destroyed by fire. Mr. Steele is very unfortunate in the results of this disaster. In addition to the large amount of fine household furniture burnt and destroyed, he has lost many rare and valuable specimens of art, collected by him during his European tour, which it will be impossible to replace.

DUBUQUE, IOWA.—The annual statement of this company, published in another column, shows a prosperous condition. We have recently had the pleasure of a visit from Mr. J. B. Howard, who so ably fills the post of superintendent.

PATENTS.

UNITED STATES.

40,800.—Albert Albertson, of New York City, for a Lamp Chimney. Antedated Nov. 26, 1863:

I claim a lamp-chimney composed of a metal frame, formed of a tube, D, rods, a, and a ring or base, E, and a glass portion, F, fitted on the exterior of the metal frame, in such a manner as to be capable of being raised and lowered thereon, substantially as set forth.

41,047.—J. B. Atwater, Chicago, Ill., for an Automatic Railroad Pump:

I claim, first, The yielding track, A, employed in combination with a pump G H, substantially as described for raising water by the weight of a locomotive or car.

Second, The combination of the levers, E E', F F', weights, P P, and cord, K, with the yielding track, A, and pump, G H, for the purpose specified.

41,048.—James R. Baker, Kendallville, Ind., for a Lamp Burner:

I claim having the upper part of the slide, C, made in the form of an annular plate, D, with arms, b, and carrying a spring, F, the whole constructed and operating in the manner herein shown and described.

41,066.—R. H. Gratix, of Salford, England, for Dyeing and Printing with Analine Colors. Patented in England, Sept. 12, 1860:

I claim the employment or use of a compound of tannin with the colors derived from analine or analagous substances formed either before or during the process of dyeing or printing, substantially in the manner herein specified, in combination with salts of tin or other mordant or mordants for the purposes set forth.

41,075.—J. G. Lefler, Philadelphia, Pa., for Filters:

I claim, first, The perforated plates, G and I, connected together by rods, H, or their equivalents, and arranged for retaining a mass of filtering material within a casing, A, and for the withdrawal of the said filtering material from the casing, substantially as and for the purpose herein set forth.

Second, In combination with the above, I claim the cap, D, adapted to the casing, and rendered detachable from the same, as set forth.

41,085.—Adolph Millochau, of New York city, for Obtaining Useful Products from the Tarry Residuum of Petroleum:

First, I claim producing an oil or grease from petroleum or coal oil tarry residuum by the process herein set forth, said process consisting in treating said residuum, firstly, with benzine or "light oil," and then with an acid, and in removing the acid by means of an alkali and water, the whole substantially as described.

Second, I also claim producing from said residuum an oil suitable for burning in lamps, by the within-described combination of processes; that is to say, by first preparing the oil or grease in the manner herein set forth, and then distilling the same, substantially as specified.

41,091.—J. Wyatt Reid, of New York city, for a Pump:

I claim the combination of the quadruple induction valves, I I' I*I'*, and the quadruple eduction valves, E E E* E'*, with the abutments, B, oscillating piston, D D', shaft, C, and cylinder, A, in the manner herein shown and described.

41,092.—E. B. Requa, of Jersey City, N. J., for a Lamp Cone:

I claim, first, The slot, a b, extending straight across the apex of the cone and obliquely downward in opposite directions at the sides, all as represented and described.

Second, The wings, c c, constructed and operating as specified.

Third, The described combination of the peculiarly-shaped slot, a b, and wings, c c, for the purposes set forth.

[This invention consists in providing the cone or deflector with a slot or opening of peculiar form, whereby free access is allowed the air to the sides of the upper part of the wick and the latter allowed to burn uniformly or evenly, entirely across its whole upper end and with a broad flame.]

41,093.—Joseph Ridge, of Richmond, Ind., for a Coal-Oil Lamp:

I claim the hemispherical cone or deflector, A', with its longitudinal sectional slot, as constructed and described, in combination with the short chimney, D, in the manner and for the purposes set forth and described.

41,094.—Joseph Ridge, of Richmond, Ind., for a Coal-Oil Lamp:

I claim, first, The hinged studs, H H, and the cup or bottom piece, J, for the purpose set forth.

Second, The rigid closing of the perforated cylinder, L, at the points of its circumference, F and F, or at any other points thereof, for the purpose of controlling the form and size of the flame as described.

Third, The aperture, F', in combination with the cup or bottom piece, J, and the orifice, O, as set forth.

Fourth, The combination of the hinged studs, H H, the cup, J, the apertures, F F', and the ears, E E, with the longitudinally-sectional slot of the cone, A.

Fifth, I claim my device as shown and described, constructed in the manner and for the purposes fully set forth.

41,108.—Henry J. Van Thiel, of Stapleton, N. Y., for a Suspended Bunker Lamp:

I claim a suspended or bunker lamp, having its fountain, A, provided with a screw plug, C, in its bottom, and a horizontal wick tube, D, attached to its lower end as herein set forth.

41,133.—Cornelius Bollinger, Harrisburgh, Pa., for a Pump:

I claim, first, The legs, R R, on the cylinder head with the lugs on the piston head, when applied to prevent its turning when the piston rod is screwed in to tighten the packing.

Second, I claim a piston rod with a screw working in the piston head and provided with a cone, by which the segments to tighten the packing may be pressed out, substantially as described.

Third, In combination with the cone on the piston rod I claim the recesses in the piston head and follower, which receive the cone, and also the recess in the cylinder head, Q, which receives the end of the piston.

Fourth, In combination with the devices for tightening the packing, I claim the spring pall, P2, making into countersinks in the piston rod for the purpose set forth.

Fifth, I claim the packing box on the cylinder head in combination with the cone on the follower or plate, M'.

In combination with the cylinder, A, I claim the valve box and valves constructed and arranged substantially as described.

41,144.—J. P. Gallagher, St. Louis, Mo., for a Hydrant:

I claim the arrangement of the pipes, n k, in combination with the chamber, B, valve, A', and opening, p, all being constructed and arranged to operate substantially as and for the purposes specified.

41,154.—Elias Hale, Terre Haute, Ind., for a Pump:

I claim the adjustable lever, D, provided with the opening, h, and adjusting gage bolt, k, the connecting rods, E E', vibrating bars, G G', and standard, C, the whole arranged and operating relatively to the piston rods, H H', and cylinders, B B', substantially as herein set forth.

41,172.—M. B. Wright, West Meriden, Conn., for a Lamp Burner:

I claim the combination of a base, A, of any suitable form, the flat wick tube, B, and the converging jacket, C, terminating in a level or nearly level top, forming an elongated aperture at a distance above the top of the wick tube, B, when the said parts are constructed and arranged in the manner herein shown and described, so that when in use the upper part of the wick will be exposed above the top of the wick tube, and the base of the flame will rest on the top of the jacket, C.

41,179.—Joseph Magoun, East Cambridge, Mass., assignor to the New England Glass Company, for a Lamp Burner:

I claim the improved burner as having its body, wick-tube cap or supporter, and wick-tube confined together by means of main and counter shoulders struck or punched up from the wick-tube, as specified.

I also claim my improved arrangement and application of the spring, C, relatively to the body, A, the cap, D, and the catch, E, the whole being substantially as explained.

41,269.—F. H. Bartholomew, New York City, for a Water-Closet Valve:

I claim combining with a pan water-closet, a supply valve, B, for admitting water into a pan, balancing diaphragms, E H, and a regulating chamber, Z, for controlling the motion of the valve, the whole being constructed and arranged substantially as shown in Fig. 1, of the accompanying drawings and for the purposes described.

41,274.—Clarissa Britain, St. Joseph, Mich., for a Lantern Dinner Pail:

I claim, first, A lantern dinner pail, constructed and operating substantially as and for the purposes described.

Second, The combination of the lamp chamber, C, flue, c', partition, c, and upper receptacle for pans, d e, arranged within the pail, a, substantially as and for the purposes described.

Third, Constructing the cover of a dinner pail with a flue, h', in combination with a flue extending down to the chamber, C, substantially as and for the purposes described.

Fourth, The combination of the removable bottom pan, B, lamp chamber, C, and one or more heating chambers, d e, substantially as and for the purposes herein described.

41,291.—John G. Garretson, Salem, Iowa, for a Pump:

I claim the joint formed by the parts f and g, with the links, i i, Fig. 1, in the position shown in the drawings when acted on by the handle, H, (Fig. 1) and made to move the pipe, D, alternately from side to side of the pipe C, and with the partition, e, forming a continuous tube for conducting the water from the bottom of the cylinder to the top of the well, making a double-acting force pump without valve or cut-off.

41,298.—Hiram Hosick, Paris, Pa., for a Pump:

I claim having the end on the pump lever made in the form of a semi-circle, G, when combined with the cords, H H, and piston rod, E, in the manner herein shown and described.

41,299.—Pierre Hugon, Paris, France, for a Gas Engine:

I claim the improved machinery for obtaining and applying motive power, hereinbe ore described and illustrated in the accompanying drawings.

41,300.—J. G. Hunt, Cincinnati, Ohio, for a Coal Oil Lamp:

I claim the inner air passage, C, surrounding the flat wick tube, c, in combination with an outer conical air conductor, A G, extending from the flame of the lamp downward around the bowl of the lamp as specified, when these several parts are constructed, arranged and operated as and for the purpose set forth.

41,327.—J. H. Shedd and Wm. Edson, Boston, Mass., for a Rotary Pump:

We claim the arrangement of two fans or buckets moving on the same center within a drum, each of which is alternately held in position as a diaphragm, while the other revolves, forcing out the fluid before it and receiving fluid behind it, substantially as herein described, and for the purposes set forth.

RE-ISSUES.

1,596.—Warren L. Fish, Newark, N. J., for a Lamp Chimney. Patented June 22, 1862. Re-issued Dec. 23, 1862:

I claim, first, Forming over and around the flame of an ordinary kerosene or other lamp, a heating chamber, having no other outlet than the flue or chimney of the lamp, and being in fact a chamber in the chimney of the lamp, by which it is adapted for heating or cooking purposes.

Second, I claim the use in connection with oil lamps of ordinary construction and operation of heating vessels containing a central flue so shaped as to form the chimney of said lamp, substantially as herein shown and described, whereby the same lamp may be used for both illuminating and heating purposes, or for either.

Third, In oil lamps of ordinary construction, and in connection with a heating vessel, I claim the use of a bulb or its equivalent device, for the intermediate support of said vessel by or over the lamp, substantially as herein shown and described.

Fourth, In combination with a heating vessel and bulb, I claim the use of a window, or of windows, or the equivalent thereof, made of a transparent material, for the transmission of light through it, substantially as and for the purposes set forth.

1,601.—Joseph T. Van Kirk, Philadelphia, Pa., and Wm. M. Fulton, Elizabeth, N. J., for a Lamp. Patented Nov. 29, 1859:

We claim, first, Forming the wick tube of lamps using a flat wick, of or from a solid continuous piece of metal, without lap, joint or seam, substantially as and for the purposes set forth.

Second, The combination of a wick tube, so formed with the spindle, E, and wheels, D D, when formed from a single piece of metal, as described.

Third, Supporting the spindle, E, and wheels, D D, by a spring, substantially as and for the purposes set forth.

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I also caution any one against purchasing a license, or privilege of using my patent, without it being signed and acknowledged BY ME, and without having first corresponded with A. DOISY, Esq., Cincinnati, Ohio, or myself.
H. P. GENGEMBRE.
Pittsburg, Dec. 21, 1863.

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This Meter combines
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The following illustrations, with the appended explanations, will give a good idea of the improvement:

Fig. 3.

Fig. 1.

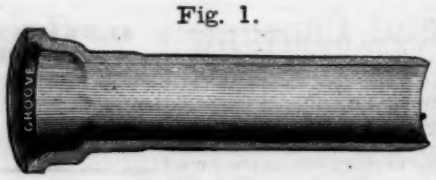

Fig. 2.

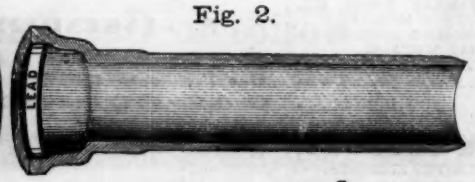

Fig. 4.

FIG. 1. Is a sectional view of a pipe showing a groove to receive a lead ring.

FIG. 2. Is a sectional view of a pipe showing a lead ring in the groove.

FIG. 3. Represents a former, which is used in the bell end of the pipe while casting the lead ring. Before using the former, however, a strip or belt of India rubber is first inserted in the socket, against which the former rests to prevent the lead escaping from the groove while being cast. Upon the cooling of the lead, the former and rubber ring are withdrawn from the socket, and the lead ring is left projecting inwards from the groove all around, forming an indestructible packing to receive the spigot-end of the pipe.

FIG. 4. Shows two pieces of pipe in connection with an hydraulic jack, by which the spigot-end of the pipe (which is cast tapering and may be cast in a chill), is forced into the lead ring in the groove which perfects the joint. A, represents the jack; B, B, the chains by which the pipes are drawn together; and C, C, pieces of pipe.

This ring joint packing may be cast at the foundry or any convenient place, and when delivered at the ditch, may be laid, and perfect joints formed, by any laborer, above or below the surface, or in ditches filled with water, there being *no joint ditching required*, and it can be laid with very great rapidity.

Among the economies realized by this joint may be enumerated, the saving in the weight of the pipe, in the amount of lead required to be used in forming the packing, in the labor of ditching, and in laying the pipe.

The bell or socket may be cast one-half the usual length, as the width of the groove requires, but from a half to one and a half inches, according to the size of the pipe, thus saving in the total weight about two hundred pounds per ton.

The weight of lead required to form this joint, as compared with the amount of lead used in forming a joint according to the old method, is fully seventy-five per cent. less, only so much being required as to maintain the compensating principle, or enough to allow (upon the raising or depressing of the line of pipe out of a direct line) what is lost upon one side of the ring packing, to take its place upon the other; thus securing flexibility of the joint without affecting its reliability. The use of yarn or hemp packing is dispensed with, the cost of which is an entire saving as compared with the old method of making joints.

The saving of labor in ditching is the total amount usually expended in digging joint-holes, there being *no joints to be caulked.*

The saving in labor in laying pipe furnished with this joint is a sum equal to the whole cost of carrying lead, fuel, ladles to the ditches, casting the lead, bailing out water, and the entire labor of caulking, less only the sum charged for casting the lead ring packing at the foundry, which is comparatively trifling. This last-mentioned economy has been estimated by the best engineers at seventy-five per cent., or the same as the saving in the quantity of lead used.

The cost of pipe cast from our patterns is the same per ton as pipe cast for the old form of joint. The principal iron-founders propose to charge the same price.

We have submitted these joints in water-pipes to a pressure of two hundred and fifty pounds to the square inch, and they have remained perfectly tight. It has also been submitted for months in gas-pipes to the ordinary pressure of our city gas-mains, without any leakage whatever. We are aware that these statements may be deemed by many extravagant, but the merits of the improvement warrant them all, and the most skeptical may be fully convinced by an investigation of its value, and by witnessing the tests to which we submit it, or by its use under any conceivable circumstances.

TESTIMONIALS.

OFFICE OF THE WATER COMMISSIONERS,
CITY HALL, JERSEY CITY, October 14th, 1863.

Dear Sir,—On the 26th of May last, about two hundred and sixty feet of cast-iron water-pipes, six inches in diameter, with joints constructed according to your invention, were laid for the Jersey City Water-Works, in Prospect street.

The operation of uniting the joints of the pipes, was performed with remarkable facility, and with an important saving in time, materials, and labor. The joints proved perfectly water-tight, after turning the full head of water on the pipes.

In my opinion, your invention has proved entirely successful, and will be found highly beneficial to water companies.

Yours, respectfully,
ROBT. C. BACOT,
Superintendent and Engineer, Jersey City Water-Works.

MR. R. C. ROBBINS.

ENGINEER'S OFFICE, CROTON AQUEDUCT DEPARTMENT.

Dear Sir,—I have examined your plan for making joints in cast-iron water pipes, and have a report from one of my assistants, of certain experiments made by you, to prove the certainty and economy with which the joints can be made, and their stability when finished.

I think the experiments showed that the joints could be made quite as rapidly, if not more rapidly, than those made in the ordinary method now in use; the quantity of lead used was less than that required in the common joint, and no yarn packing was required. In these respects, your joint seems superior.

After the joints were made, a pressure of three hundred pounds to the square inch, was put upon the pipe in such a manner as to test the efficiency of the joint to prevent both leakage of water, and separation of the pipes from each other longitudinally. This pressure failed to produce either leakage at the joint, or separation, so long as the pipes lay in a direct line; but on deflecting them six and a half inches, in a length of twelve feet, the joint commenced leaking. It is fair to add, that this is a greater deflection than would often be found necessary in laying pipe.

I think the efficiency of the joint in both the points tested in this last experiment, might be increased by increasing the quantity of lead, both in thickness and width.

Altogether, the result of the experiments was such that I have determined to make a more thorough est of your invention by putting down about one thousand feet of pipe, when we commence our operations for the coming season.

The diameter of the pipe subjected to experiment, was six inches, and is the same size that I propose to put down next year.

I am, very respectfully, your obedient servant,
A. W. CRAVEN, Chief Engineer, &c.

To R. C. ROBBINS, Esq., Jersey City.

METROPOLITAN GAS-WORKS,
ENGINEER'S OFFICE, NEW YORK, October 9th, 1863.

Dear Sir,—The undersigned had the pleasure of being present at an experimental test of your patent joint for gas and water pipe, made at the yard of the Croton Aqueduct Department, and cheerfully testify to the results obtained, namely:

First experiment was made with two lengths of eight-inch pipe, jointed together, when a pressure of three hundred pounds to the square inch was applied. This pressure did not force the pipe apart, nor start the joints, but they remained, during this experiment, perfectly tight.

Second experiment was made by deflecting the pipe five inches, which is about equal to eighteen inches in one hundred feet, and the same pressure applied, which caused a small leak at the joints.

Third experiment was made by taking the pipes apart and rejointing them, when the same pressure was applied when lying straight and when deflected; at this experiment there was no leakage.

From these severe tests it is my impression that the superiority of your patent joint has been made manifest, and that it must eventually supersede the old way of jointing pipes together, saving both time and material.

Wishing you success in your enterprise,

I am, very respectfully, yours, &c.,
AMBROSE J. WHITE, Engineer.

To R. C. ROBBINS, Esq.

OFFICE OF THE METROPOLITAN GAS-LIGHT COMPANY,
NEW YORK, October 9th, 1863.

Dear Sir,—Having been present at the testing of your patent joint for gas and water pipe, at the yard of the Croton Aqueduct Department, I can testify to the results as stated by Col. A. J. White and fully concur with him in the opinion expressed in his letter to you of this date.

Very respectfully, yours,
W. TITUS, Secretary.

R. C. ROBBINS, Esq.

NEW YORK, October 23d, 1863.

Gentlemen,—I am pleased to be able to inform you, that we are fully satisfied that we have done well in adopting your "Improved Joint," in the construction of an aqueduct which we are now building on Oil Creek, Northwestern Pennsylvania.

We have ten miles of three and four inch pipe to lay this season, and, in our estimation, the perfection of the joint, economy in lead, and rapidity with which the pipe can be laid, render it entirely preferable to any other method of laying pipe.

Our Mr. Hutchings advises us that he is putting down the three and four inch pipe at the rate of twenty-five to thirty lengths per hour, with two men in the trench. We are much pleased with this result.

Respectfully yours,
HUTCHINGS & FOSTER.

Messrs. R. C. ROBBINS & Co.

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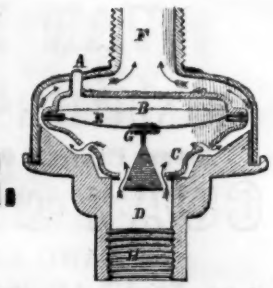

Notice to Gas Companies and Consumers of Gas generally.

WE RESPECTFULLY INVITE YOUR ATTENTION TO THE FOLLOWING TRUTHFUL DESCRIPTION OF THE construction and operation of this recent and most important invention; its application to every street lamp, and on the fixtures within the works of the Gas Companies, as well as for the use of the general consumer, will be found to effect perfectly and reliably, the object so long sought for, viz.: **a perfect control of the Gas under varying pressures, emitting the Gas at the burner without force, and without increase or diminution of quantity, and hence promoting the highest possible illuminating power of the Gas.**

THE AUTOMATIC GAS CONTROLLER

Is designed to occupy the place of the gas-burner. Within the circumference of a small cylinder, below the burner, is placed a conical valve, attached to a movable diaphragm, the valve and valve seat is proportioned, so that under a supply of Gas, varying in pressure from four-tenths to five inches, the burner will continue to produce the same consumption and development. The unerring accuracy of movement of the Diaphragm at every change of pressure, whether gradual or sudden, and its positive control of the valve which admits, by its proportionate increased or diminished aperture, the same unvarying amount of Gas, has elicited the unqualified approbation of engineers and other experts in the profession.

The simplicity of its construction, and materials used, are a sure guarantee of its durability and continued successful operation. They afford to the consumer of Gas the advantage of **a superior light, with the greatest possible economy**; and for the Gas Company, they control the Street Lamps, affording a more satisfactory light for the public, without waste.

The public are invited to witness its operation, at the Office of the Company; and samples will be sent to Gas Companies for experiment, on application by letter or otherwise.

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J. H. ADAM, President New York Gas Company.
PETER COOPER, Cooper Institute.
JOHN A. DUFF, Olympic Theatre.

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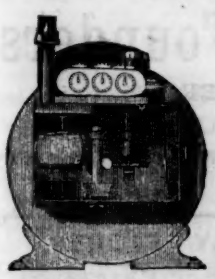

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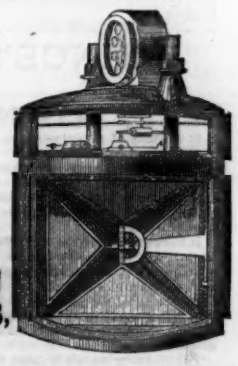

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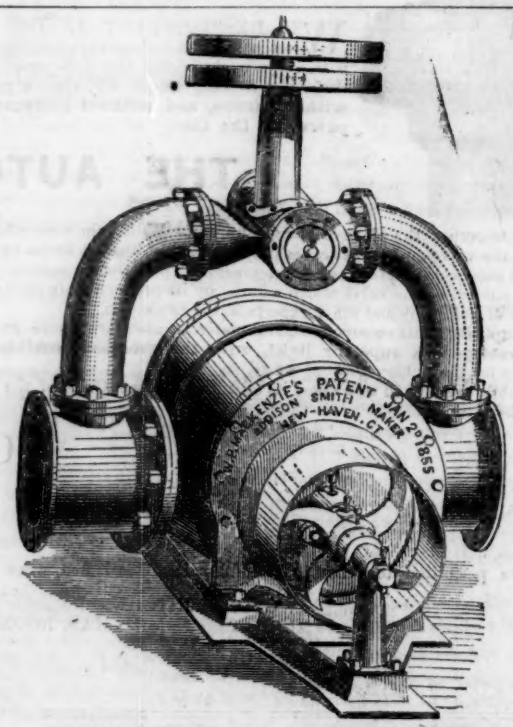

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